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AGRICULTURE, SHIKAR & TRAVEL.

EDITED BY

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THE

INDIAN FORESTER.

Vol. XVIII.] July, 1892. [No. 7.

The Forests of Natal

Being an account of the Report on them, by Mr. H. G. Fourcade of the Cape Forest Service, by D. E. Hutchins.

Part 2.

The formation of dongas or what would be called "nullahs" in India, is thus described.

"A remarkable feature of the Drakensberg country, more 'particularly between the Hlatikulu and the Tugela Valley, 'consists in the powerful erosion of the soil by the summer down-'pour. The hill sides are scored with torrential ravines, *dongas*, as 'they are called in Natal, of comparatively recent formation, which 'go far to disfigure the country and reduce the value of the land 'for agricultural purposes. Dongas are not found in normal condi-'tions, and their spread is always related to the destruction of bush 'and herbage. It is probable that the burning of the veldt by 'which grass and bush are kept down, is the principal cause of 'their formation. The physical conditions of Natal are in many 'respects similar to those of the south of France, and equally 'favourable to the formation of torrents. We have the same 'sudden heavy rains falling over a hilly country sloping rapidly 'from the mountains to the sea; and there are unmistakeable 'signs that in Natal an outbreak of torrentiality is at present in an 'incipient stage. Floods are not unknown; those in April, 1856, 'February, 1866, and recently that of January, 1886, are reported 'to have been very destructive, and ravines, locally known as 'dongas, are already a consipicuous feature of many parts of the 'country. Possibly dongas do not yet incommode farming to any 'serious extent; but it should be borne in mind that one of their 'attributes is to spread at a continually increasing rate, and that 'even now, this rate, though it is yet small, is by no means' 'insensible. Each one of the hundreds of dongas which 'I have seen in Natal, appeared to me of recent formation;

'and whenever any definite information could be got from 'old residents or natives, I found this to be the case. Some 'of the ravines known to have made their first appearance only a 'few years back, have now attained a depth of ten or twenty feet, 'and a greater width. The head of the Tugela Valley has been 'very much cut up by the summer showers, and dongas there 'extend for miles; the Tugela itself has every characteristic of a 'torrential river. When following the coast, the rivers of the 'colony, crossed near their mouth, look as if they were streams of 'silt and *débris* as much as streams of water.

'The diminution of the forests, and the practice of burning 'the grass in summer, which leaves the ground unprotected and 'liable to be loosened by rain and cattle precisely when the violent 'thunder storms occur, are sufficient causes to account for the 'increased guttering of the land. Indeed, the experience of other 'countries makes it necessary to explain why in Natal, with causes 'so potent, the effects are not already greater. The destruction of 'forests and of herbage has been severe only within a compara-'tively recent period. The Hottentot races, which, a few centuries 'back, peopled South Africa, were neither pastoral nor agricultural, 'and their numbers remained small, so that the natural conditions 'of the country were but slighly interfered with; and it is only 'with the advent of more destructive races and their great increase 'in late years, that vegetation began to be checked and that even-'tually the erosion of the ground was manifested, at first in an 'insignificant and protracted manner, then by degrees in a more 'and more rapid form. At present, the mantle of verdure which 'covers the mountains, still acts as a powerful brake on torrential 'action, but if we are to allow what remains of forest to be des-'troyed, and the mountain grasslands to be burnt and grazed in-'discriminately, the ruin of much of the land will become a matter 'of years, and perhaps it would not then be feasible to spend 'millions in redeeming it. While it is in our power to avert such 'consequences, we should profit by the experience that has been so 'dearly bought elsewhere, and not neglect to adopt any reasonable 'protective measures. Besides being cheaper, it is also better to 'preserve natural forests, than destroy them and substitute planta-'tions which take centuries to acquire the deep layer of humus and 'the surface growth which give such a peculiar climatic value to 'the natural forest."

Thorn Bush.—Below the high-timber forests of the Natal mountains, lie stretches of thorny scrub sloping towards the coast exactly as in the east of Cape Colony.

"The Thorn Bush of Natal is spread over vast areas in the 'Midland region, at an altitude of from 1,000 to 3,000 feet. It is 'densest at the lower elevations, and a belt of grass country 'almost entirely separates it from the Heavy Timber Forests. 'Towards the coast, however, it merges gradually into the Coast 'Forest. It chiefly consists of various species of mimosæ of which

'*Acacia Natalitia, A. horrida, A. Kraussiana, A. Caffra* and '*A. arabica* are the most noticeable. The distribution of Thorn 'Bush is shown in map I, and the Report of the Forest Commission 'of 1880 gives the total area covered by Thorn Bush as 196,000 'acres on private lands, but these figures appear to include Coast 'Forest, which would form an appreciable fraction of the whole. 'The clearing of Thorn Bush for firewood or for native cultivation 'has been very extensive of late years. The continually recurring 'grass fires arrest the growth of young plants, and the forest is 'seldom known to recover. Large areas may often be seen that 'are thickly studded with minute plants which would grow into a 'forest if protected from the grass fires. The Thorn Forests are 'usually ill defined and consist often of isolated trees or clumps 'thickly distributed over a large stretch of country."

Coast Forests.—The Coast Forest of Natal in a mild semi-tropical climate wherein flourishes the sugar-cane, the mango, the Madras cooly, and other tropical products—consists of a mixture of Cape and tropical species, the latter predominating. It is remarkable that in the list of coast species given at page 21 of Mr. Fourcade's report, occurs the Upright Yellowwood. In the east of Cape Colony, the Outeniqua Yellowwood is found in favourable situations near the cost but *never* the Upright Yellowwood. Nor does it occur at all abundantly in the mountain forests, till near an elevation of about 3,000 feet. Probably the Natal coast Yellowwood is that referred to at page 134 as *Podocarpus Thunbergii* var. *falcata*; and the common upright Yellowwood of the Cape, *Podocarpus latifolia*, Mr. Fourcade terms *Podocarpus Thunbergii* var, *latifolia*.

"With the exception of those in the Lower Umzimkulu 'Division, nearly the whole of the Coast Forests are situated on 'private property. It appears that surveyors have not hitherto 'considered coast forest to be forest within the meaning of their 'instructions, and it has been freely alienated; but what remains 'should be preserved as far as circumstances will permit. The 'Coast Forest is still extensive, but much of it has been cleared for 'planting, nearly the whole of the cultivated land in the Coast 'districts consists of cleared bush ground. This extensive denu-'dation is said by old settlers to have somewhat altered the climate, 'causing a greater aridity and more irregularity in the weather. 'Yellowwood and wagonwood were formerly cut in many of the 'coast forests; but few good timber trees are now left. The Coast 'Forest is generally low, the average height varying from 30 to 60 'feet. It contains a great variety of trees, the wood of some of 'which is of great value.

Descriptive Catalogue of Forest Trees.—Appendix I completes the description of the Natal forests. This is a Catalogue with a short, useful description attached, of the forest trees of Natal. It comprises 167 species and is the most complete of its kind yet published. It includes nearly all the

Cape timber trees and took its place at once in the forest libraries of South Africa. It may be noted that the tree with the curious name of "Bogabog" in Natal, is the well known and abundant "Wild Lemon," *Xylosma monospora*," of the Cape eastern forest; also that *Kiggelaria africana* is a handsome and abundant timber tree, the wild Peach of the Eastern forests of the Cape Colony, while *K. Dregeana* is the western species, rare in the Knysna forests where it is known as Fatherland's Rooihout. *Combretum salicifolium* and *Buxus Macowania*, believed to occur in in Natal, are omitted from Mr. Fourcade's catalogue. Two useful alphabetical lists of vernacular and botanical names together with tables of relative strength and specific gravity, complete the Catalogue, which is prefaced thus:—

"In this enumeration, I have followed, for the sequence of 'the orders and genera, the "Genera Plantarum" of Bentham and 'Hooker, and retained for the orders their numbers in that work.

'A catalogue of this kind can only be rendered tolerably 'complete gradually during a period of years, and the present 'collection of notes, taken during the last few months, is necessarily 'wanting in many respects, but it is given in order to provide some 'source of information about the Natal woods.

'The forests were visited by me during last autumn and winter, 'when very few flowering specimens could be collected for deter-'mination. In the Drakensberg forests, many trees were identified 'from a previous knowledge of the species. In other cases, the 'determinations were made by comparison of the specimens in the 'Government Herbarium at Durban, and I should like to record 'my indebtedness to Mr. J. M. Wood, A. L. S., Curator of the 'Durban Botanic Gardens, for allowing me unrestricted access to 'the Government Herbarium, and giving me the full benefit of his 'unrivalled knowledge of the Natal flora.

Some of the genera of Natal plants have not been worked out 'in a full manner by botanists; and most of the species of *Acacia*, '*Celtis*, *Ficus*, and *Cryptocarya* could not be determined.

'With the exception of two well-known woods that were not 'identified, all doubtful or undertermined species have been uni-'formly excluded."

Then follow interesting tables showing the growth of various indigenous trees grown in plantations in Natal compared with the results of observations on the same trees in natural forests at the Cape. The more important Cape species show the following yearly increase in gifth (taken from trees growing in the main forest, Knysna):—

Hard pear: *Olinia cymosa*	1·17	inches.
Laurel: *Ocotea bullata*	0·95	„
Outeniqua Yellowwood: *Podocarpus elongata* ...	0·84	„
Upright Yellowwood: *Podocarpus latifolia* ...	0·48	„ }
The same in the Gouna forest	0·72	„ }
White Pear: *Apodytes dimidiata*	0·62	„

Plantations—Natal.

Outeniqua Yellowwood	...	...	...	2·02	„
Upright Yellowwood	...	...	...	1·18	„

In describing Stinkwood or Laurelwood, *Ocotea bullata*, at page 117, by "Kaffraria" is meant the Transkei. Very curiously and unaccountably, in what was formerly the colony of British Kaffraria, *Ocotea bullata* exists only as a rare botanical curiosity. In the forest country to the North-east and South-west of it, Laurelwood is abundant. *Ocotea bullata* is the most important forest tree in South Africa. It has a weak natural reproduction from a very perishable berry, but a remarkably strong reproduction from coppice shoots. Whether the trunk of the tree be cut by man, or left to decay, the stool produces an abundant sheaf of coppice shoots. But the berry decays, or, rarely, germinates while still on the tree; and all attempts to secure sound seed and raise the tree in nurseries on a large scale have failed. It seems possible that the curious geographical distribution of Laurelwood has to do with its abnornal natural reproduction.

The tree referred to at page 114 under the misleading local names of Ironwood and Coast assegai, is the well known and widely distributed Wild Olive, *Olea verrucosa*. This tree is hardly distinguishable from the common Olive of Southern Europe and North Africa, *Olea europaea*.

It should be noted that *Strychnos Atherstonei* scarcely occurs in the Eastern Province outside the Alexandria forests. Also that Sandalwood in India flourishes at a mean temperature of 74° not 82°, page 183. It, in fact, flourishes between mean temperature limits of 64° and 78°.

At page 116, the English and Dutch names for the common *Halleria lucida* are omitted. At page 185, the mean temperature of Perth, Western Australia, is stated to be 70° instead of 61°.

At page 189, *Pinus Pinaster* and *Pinus Pinea* are both entered as of moderately rapid growth. This is true of the latter, but the former (cluster or maritime pine) has, in these latitudes, a very rapid growth. I have seen a radial increase of 1 inch per year on recently cut pine stumps in the Cape Peninsula, maintained throughout the greater portion of the cross section. These two pines are thoroughly naturalized in the Cape Peninsula plantations, reproducing themselves easily from self-sown seedlings. There, it has been stated on good authority, the growth of the cluster-pine averages twice that of the stone-pine.

Before quitting this interesting report, special attention must be called to the figures of growth obtained from plantations in Natal. I have not met with any record of systematic measurements yielding higher figures than those given in my "Report on measurement of the growth of Australian trees on the Nilgiris," for the *Eucalyptus Globulus* or Blue-gum. This shows a yield 12 tons of dry wood per acre, per year, for fully stocked plantati

up to 20 years of age. (After the lapse of 8 years, it would be interesting to learn whether, as was anticipated, this yield is maintained).* Now, Mr. Fourcade visited plantations near Maritzberg, the capital of Natal, where the rate of growth appeared to be close on three times that of the Nilgiri Blue-gum, *i.e.*, 30·5 tons of dry wood per acre per year. In the Nilgiri plantations, the rate of growth was calculated from actual measurement of all the trees in oblong shaped sample areas, taken through average portions of the plantations, thinnings and blanks being allowed for where they occurred. Mr. Fourcade took average diameters and heights, and reckoned thus the cubic contents of an average tree. Multiplying this by 302, the number of trees planted and still standing per acre, he obtained a yearly increment of 1,711 cubic feet per acre, equal to 30·5 tons of dry wood. It is possible that he may have somewhat over estimated his average tree and that the number of trees per acre may not be, as they appear, quite the same as originally planted. But he has since assured me that his figures admit of no doubt: and though the method adopted is less rigorous than that of actual measurement of the standing stock, I can not think there is any reason to doubt the substantial accuracy of these astounding figures. I have written to Mr. Schöpflin, now Conservator in Natal, calling his attention to them and suggesting a verification. Mr. Fourcade, convinced of the quite exceptional tree-growing power of the Natal climate, seeks an explanation in electricity. It is certain that electric storms are very frequent in Natal and that they are practically unknown in Knysna, while the ordinary conditions of growth—a hot sun, abundant moisture, and a fertile forest soil—exist in both localities. And it appears established from Mr. Fourcade's observations that under nearly identical conditions, tree growth, both in plantations and in natural forest, is greater in Natal than in Cape Colony.

The subject is extremely interesting and it is a practical one on which many Forest Officers might contribute observations, especially from the climates of India.

I have witnessed some remarkable electric displays in South-Africa, but nothing so intense as the breaking of the monsoon on the Western Ghauts of India. Neither, I believe, is there anything in India to surpass the tree-growth in the Western Ghaut forests.

"*Production of wood.*—In the case of gums, the rate of 'growth may be ascertained accurately, as there are sufficiently 'old plantations of the kind in Natal. Mr. Topham's plantation 'near Maritzburg, may be taken to be a fairly average one. The 'oldest plot, 40 acres in area, is 17 years old and consists of mixed '*Eucalyptus Globulus, E. longifolia,* and *E. rostrata,* the rate of 'growth of each appearing not to differ widely. The trees are

* *Note.*—So far as our personal experience has gone, it has been fully maintained.

Hon. Ed.

'planted 12 feet apart, so that there are 302 to the acre; they 'average 4 feet 10 inches in girth at three feet from the ground, 'and 115 feet in height. Adopting the form-factor of 0·450 de- 'duced by Mr. D. E. Hutchins from measurements in plantations 'on the Nilgiris, the contents of each tree average 96·3 cubic feet 'and the standing stock per acre 29,083 cubic feet, representing 'a yearly increment of 1,711 cubic feet per acre. The weight of a cubic foot of *E. Globulus* (dry wood with bark) averages 40 lbs., 'equal to 56 cubic feet per ton, according to Mr. Hutchins, and 'the average density of the wood of the other species differs so 'little, that it may be taken as being the same. The annual in- 'crement in tons of dry wood per acre is thus 30·5 tons, and this 'is a marvellous rate of growth. Individual trees even greatly 'exceed this rate: one specimen of the *E. longifolia*, 17 years old, 'being 12 feet 6 inches in girth at three feet from the ground, 'and 115 feet in height."

To the report is appended a note on forest meteorology. The remarkable periodicity of the rainfall in South Africa is thus referred to.

"The connection between forests, and rainfall in Natal is a 'wide subject, that cannot be treated exhaustively without special 'study, and more data than are at present available. The rainfall 'fluctuates from year to year in an apparently irregular manner, 'but, in reality, it is governed by cycles with regular periods. 'My friend Mr. D. E. Hutchins, who has made a study of the 'variation of the weather of South Africa in cycles, finds a close 'connection between solar energy, as indicated by sunspots, and 'the rainfall.* He also traces secondary cycles, one with a period 'of 9·5 years, which he terms the "Storm Cycle," from its associa- 'tion with violent gales and numerous shipwrecks, the other with 'a period of 12·5 years, which he terms the "Mitigation Cycle." 'Droughts prevail at the sunspot minima every 11·11 years '(Wolf's Sunspot period), unless masked by a coinciding wave of 'the "Storm Cycle," or of the "Mitigation Cycle." These three 'cycles give, in the opinion of Mr. Hutchins, a complete key to the 'South African weather, and the character of the season since 1884, 'particularly last year's severe drought, have been successfully 'foretold by their use. The "Storm Cycle" is the most prominent 'feature of the Cape Town rainfall, while the "Mitigation Cycle" 'governs more powerfully the rains of the Eastern Province. I 'have sketched a diagram which seems to indicate a close 'connection between the waves of rainfall observed by Mr. 'Wilkinson, at Ottawa, and the three cycles discovered by Mr. 'Hutchins. To this, I may add that at Cape Town there are un- 'broken rainfall returns for exactly half a century. During the 'whole of these 50 years the only instances of unpunctuality. 'the regularly recurring rainfall periods were:—that in 1862

* D. E. Hutchins. Cycles of drought and good seasons in S. Afric (W. Wesley. 28 Essex Street, Strand, London.)

'rain came one year late; and that the last sunspot rains, those 'of 1883, were slightly prolonged. The mean rainfall of the 'heavy rain years at Cape Town is 34·4, of the drought years '22·18 inches.

'These variations are sufficiently wide to be of practical im-'portance; and I am well within the truth in saying that the 'chances of successfully forecasting the character of the seasons 'are now as 50 to 1. Periodicity may be noted in the rainfall 'returns of other stations in the Southern Hemisphere; but now-'here, as far as I am aware, are there data for founding regular 'cycles of drought and good seasons as at Cape Town."

Mr. Fourcade winds up his able and useful report with the following summary:—

1. "The Natal Forests, more particularly the Timber forests, 'have been shown to be well worth preserving, whether from an 'economic or climatic point of view; and the Government alone is 'competent to undertake the work.

2. 'The condition of the forests is, for the most part, lament-'able, and the result of past abuses; their destruction is proceed-'ing apace, and the following measures are recommended to ensure 'their preservation and utilisation to the best advantage.

(*a*) 'The survey and demarcation of the principal forests.

(*b*) 'Their protection from fire, from depredations, from 'destruction by natives or cattle, by means of suit-'able measures such as the clearing of fire belts, the 'establishment of small wattle plantations, the pro-'hibition of wattle cutting and cattle grazing, with 'the aid of proper supervision and special legislation.

(*c*) 'The closure of the forests pending survey, demarca-'tion, and settlement.

(*d*) 'The adoption of sound methods of forestry to secure a 'steady yield, improvement of the forest, and most 'profitable management.

(*e*) 'The utilization of Colonial woods for railway sleepers.

3. 'Plantations of conifers and hard woods, designed to supply the future requirements of the country, can be made 'profitably along railway lines in the upland and the midland 'districts.

4. 'The most urgent work of a Forest Department in Natal 'would be to save what is left of the native forests; and plantation 'work should be deferred, till it can be undertaken without detri-'ment to the progress of survey and demarcation."

To this I may add one recommendation. A glance at the instructive forest map of Natal given as a frontispiece to the Report shows how large a proportion of the high-timber forest has been [illegible]ated: in fact, all the largest and most accessible patches of [illegible] forest are in the hands of private owners. This should [illegible]ied, as early as possible. Along with funds for p[illegible]

VI.—EXTRACTS, NOTES AND QUERIES.

On Judicious Pruning.

By William M'Corquodale, Forester and Wood Surveyor, Scone, Perth.

It is to be regretted that there are so many conflicting opinions on this subject. Some authors strongly advocate the advantages of skilful pruning, while others positively deny that any advantage accrues from even the most judicious pruning.

In the English Crown Forests, pruning was abandoned some thirty years ago. Following that example, the same course has been adopted on many private properties in both England and Scotland.

Some theorists declare that there is such a connection subsisting between the roots and branches that when a live branch is removed all the corresponding roots supporting that branch immediately cease to perform their functions and die.

I well remember, nearly forty years ago, having an interesting conversation with an able arboriculturist on the subject of pruning, when he substantially denied that the art of pruning in any shape or form would do good. He maintained that when a live branch was taken off a tree, the roots in the ground supporting that branch would die. After a considerable amount of discussion, I asked him to answer one question in support of his theory, and I would be satisfied. That question was—"Why is it 'that, when a healthy oak tree is cut down, the roots do not die; 'but, on the contrary, continue in vigorous action, and the stool 'immediately produces a healthy crop of shoot?" To this question he gave no reply.

Soon after this, I resolved to try experiments to enlighten myself on this subject by sowing a few seeds of *Abies Douglasii* in a convenient corner in my garden, to see if I could make any satisfactory discovery relative to the subject of our discussion. From these seeds I reared one plant for four years till it was about 3 feet in height. During that period I never allowed even a bud to form on the stem of this plant. So as soon one appeared, it was at once rubbed off. The plant, notwithstanding, grew with a beautiful clean, straight stem; but unfortunately, in the fourth year of its growth, in autumn, when the hedger was engaged cutting the garden hedge, he accidentally broke it over near the surface of the ground. However, it had answered my purpose very well. I grubbed up the root carefully at once for inspection, and, to my agreeable surprise, found it unusually large for a plant of its size, seeing that it was never permitted to produce the semblance of a branch. The root was divided into three large

forks, and these were matted with healthy fibrous rootlets at their extremities. From my friend's point of view, I expected that this plant, which was reared branchless, would have no other root but the tap-root; but I found no difference in the ramification of its roots from that of young plants of the same age having the whole of their natural branches.

I shall add another illustration as to the connection subsisting between the roots, branches, and stools of trees, which, together with the foregoing remarks, will, I trust, go far in confuting the opinion entertained by certain theorists that the removal of a live branch will prove fatal to the corresponding roots supporting it.

I have repeatedly fallen in with pine-root stools which continued their vitality for many years after the tree was cut down, with the face of the stool healing over from the outside as regularly round the whole stool and in the same way as a wound on the trunk of a tree after a branch has been pruned off. In all such cases it was found that the stools had—prior to the trees being cut down—roots united with, or naturally engrafted into, roots of an adjoining tree of the same kind, which roots continued to draw sufficient nourishment from the standing tree for the support of the stool for years after their own tree was cut away.

About ten years ago I found a larch stool in Scone Wood about ninety years of age, the stem of which had been cut off some ten years previously. This stool was a solitary one, too far apart from any larch or other fir tree to nourish it. Yet this stool was in life; growing and healing all round. I got men with tools and laid its roots bare They were all far gone with decay, save one, which was quite fresh. I traced it to its nurse, and found it to be lying across, deeply embedded, and strongly engrafted into, a healthy root of an adjoining ash tree. How is it that this engrafted root, without the aid of a green leaf, nourished the whole stool, giving circulation to the sap all round, and producing sap-wood and bark? This is a question for botanists and theorists to solve.

Judicious pruning is a very important branch of forestry. I do not hold that even judicious pruning will, as a whole, augment the bulk of timber in a tree; but, from my experience of fifty years, watching the beneficial result of its effect upon trees under my management, I certainly hold that early periodical pruning, when skilfully pursued, will have the effect of producing ultimately a much larger yield of clean, straight, valuable timber per acre than would have been the case had the trees remained in a natural condition. No doubt there are individual trees that on certain soils grow naturally tall and straight in the bole, and therefore require but slight artificial training; but, generally speaking, with few exceptions all oak trees require skilful training, and when trees are properly treated in this manner a larger number can be reared per acre, and are not so likely to be blown over by high gales, or to have their limbs torn off.

I should fancy that the opponents of pruning never themselves had the advantage of seeing the beneficial results of systematic pruning. The benefit accruing from such training is not be obtained in a few years. An arboriculturist treating a young plantation in this way, and following up its training, may be forty or fifty years before seeing the actual result of his operations. Of oaks that were pruned at Scone under my direction forty-five years ago, hundreds are at present being cut up at the saw-mill for the building of railway waggons, and to me it is most satisfactory to find the timber so sound, free from blemishes, and beautiful.

I have seen pruning so barbarously performed and the trees mutilated in such a manner that it must have proved disastrous in the highest degree, ruining the constitution of the trees, retarding their growth, and ultimately yielding faulty timber. Such pruning should not upon any account be tolerated; and when the timber comes into the hands of tradesmen it is no wonder that pruning is condemned But the effects of judicious pruning are of an opposite character.

Young oak trees from the nursery to be planted in the forest should receive no further pruning than the shortening of contending shoots or strong side branches. When they arrive at six or seven feet in height they should receive a regular course of training by pruning, which can be performed almost wholly by the use of the pruning knife. The operator should always begin at the top of the tree, shortening shoots which rival the leader more than half their length. Strong rambling side branches should also be shortened fully one-half; and when a tree is overcrowded with branches low down, some of these ought to be thinned out and pruned close to the stem. Young trees at this stage of growth should be so well balanced and shaped that little or no pruning will be required for several years after.

In the next course of pruning, the operator ought to be provided with ladder, pruning-saw, pruning-knife, and shears on long handles. Before ascending the tree, he should examine it minutely, and see what will be required to balance and shape the tree properly. After ascending, he should begin at the top, shortening the rival leader, if there be one; but as there is often a difficulty in reaching a rival top, the pruning-shears are brought into requisition to shorten it.

The operator, in descending the tree, should shorten extra strong branches at least half-way in. These would always be cut at a lateral small branch, or twig, of an upright growth. Strong branches growing pretty low on the bole should be shortened well in near the bole, in order to throw vigour up the stem of the tree. At this course of pruning, a few branches ought to be pruned away at the bottom, close to the stem. Other successive courses of pruning should be conducted on the same system, with this addition, that more branches will be required to be pruned close to the bole.

The point to be studied for the safe guidance of the operator is—what is the largest size of a branch that can be pruned from the bole without leaving any blemish in the timber? The health and vigour of the tree is the safest guide for this. I have seen the boles of trees thirty-five to forty years of age after being pruned healing at the rate of half-an-inch a year from each side of the wound, whereas trees in a less vigorous condition did not heal over one-fourth of an inch in a year. Therefore the health and vigour of the tree should be the guide, so as not to prune a branch from the bole of a tree if the timber at the wound will in any way deteriorate before it heals over. Rotten branches on the boles of trees should be pruned off before they are affected with rot at the base, in order that the wounds shall heal before decay takes place.

Great care should always be taken against over-pruning, as thereby trees are retarded in their development, and rendered very unsightly. Trees at the final course of pruning ought to be left with their heads varying from one-half to one third of the tree. Oak coppice has become so worthless that pruning it need not be discussed.

The History of a Railway Sleeper.

Travellers on the North-Western Railway during the past year must have noticed with surprise the vast number of sleepers collected at Delhi and Umballa for the Delhi-Kalka Railway, and have wondered from whence such quantities of light coloured timber have come. Sleepers, as is generally known, are laid crosswise on the ballast of the railway line, and on them the rails are fastened; they are placed approximately three feet apart, so about 1,760 sleepers are required each running mile of line. The white wood of which sleepers are composed is not found in the plains, but comes from the hills many hundred miles away. In the vast forests of Garhwal, Sirmoor, and Jaunsar, the hill sides are thickly clad with deodar (*Cedrus deodara*) and chir (*Pinus longifolia*) from which sleepers are chiefly made; these regions are a country in which there is not 100 yards of level ground; where in places, thousands of young trees can be seen coming up as thick as corn in a field; and supply most of the timber used on railways, in roofs, doors, &c. Felling the trees, and sawing the logs, is done by professional sawyers during the dry season of the year from October to June; during the rains the forests are nearly impenetrable and little work is done. After being sawn, the sleepers are sent down the hill sides, which are cleared to allow of their easy descent! or down shoots specially prepared for the purpose; or down timber *runs*, which are planted slopes on which the sleepers side, each succeeding one pushing that in front till it reaches the river side, at the bottom. These hill sides are of wonderful beauty

and wildness, but from their inaccessibility they are seldom visited except by the forest officers in whose charge they are. After reaching the river sides, chiefly those of the Jumna, the Tonse, and the Giri, they are thrown into the water and are carried on till they reach the valley of the Dun where the rivers debouch from the hills ; at Dhakpathar they are stopped by a boom placed across the river, and collected by their various owners. Before the sleepers are thrown into the rivers they are marked on the broad side close to the ends. Each owner has his mark registered in the Forest Office on payment of a fee, so on reaching Dhakpathar the sleepers are all claimed; sleepers that have no mark become the property of Government, but broad arrows are used to mark those cut in Government forests ; three arrows denoting first first class timber, two arrows and one denoting inferior qualities.

The boom is placed diagonally across the Jumna where the bed is rocky and deep on the western Sirmoor bank, and shallow on the eastern or Dun bank: it consist of two beams of deodar, 15 inches deep, 6 feet apart,in lengths of 10 feet, held together by sleepers placed crosswise and dove-tailed into the top, the whole being kept together by wire rope passing through rings fastened on the top and round the beams at the joints; the wire ropes are strongly attached to the rock on the west side, while to keep the boom in position, wire rope guys are fastened from the east side. Below the boom are timber logs, also kept in position by wire ropes, the object of the logs being to allow the passage of rafts over them. The sleepers coming down the main stream on the western side are diverted on to the eastern side by the boom collected by the owners in the shallow waters on the east, and stacked on the river side.

The boom is put up annually about the 15th November, and taken to pieces about the 15th June when the Jumna floods begin. It has only been in existence about 5 years ; previous to which, sleepers were collected by the Maharajah of Sirmoor, and by a contractor who made a large fortune in a few years. As portions of the rivers Tonse and Jumna pass on one side through Sirmoor territory, a fair proportion of the dues collected by the Forest Department is paid to the Maharaja. The Forest Agency look after the sleepers for 10 miles above Dhakpathar, returning to the water any that get stranded on the river sides: they put up and maintain the boom ; and rescue any sleepers that get past the boom owing to floods or accidents ; for doing this, carriage dues are charged on each sleeper for the river passage ; collecting dues for the boom ; and salvage dues for any sleepers rescued. The dues are very small, but, as the number of sleepers and karis sent down exceeds thirty lakhs annually, of which about three lakhs come from Government forests, the total the of proceeds amounts to a very considerable sum. A good deal of difficulty is experienced in maintaining the boom ; small floods and freshets come down the river after each fall of rain ; and in

April, when the snows begin to melt, sleepers constantly get under the boom; at night also in cold fresty weather it is hard to keep the establishment up to their work. It is greatly to the credit of the Department that only about 1,500 out of 30 lakhs of pieces get past the boom, a proportion of about 1 in 2000.

Some of the sleepers come from near the source of the Jumna, 110 miles above Kalsi, where it enters the Dun. The river flows over a succession of rapids, with a fall of about 20 feet per mile, through some of the most beautiful scenery in the world. The tall peak of Jumnotri, the source of the Jumna, can be clearly seen clad in everlasting snow, on a fine day, from the plains at Saharanpur; Gangotri, the source of the Ganges, being also seen on the eastern side, some 60 miles away. At Kalsi, where the Saharanpur-Chakrata road is carried over the Jumna by a fine suspension bridge, on the right bank is to be seen the Chhatr-Sila, or canopy stone, a monolith which is inscribed with the edicts of Asoka; it is supposed to be an ancient boundary mark between China and Hindustan. The stone is a quartz boulder, 10 feet long, and of the same height, inscribed with letters on two sides, and figures of elephants, &c., on the others. The name is probably due to its having been once covered with a canopy, as there are a number of squared stones close to the rock which probably formed the pillars

A short distance above the junction with the Jumna, the Tonse has a beautiful spot known as "the dripping wells;" clear limpid spring waters filter through the rocks and fall in showers on the river banks, the surface of the rocks being covered with enormous fronds of maiden hair, (*Adiantum capillus-veneris*, (Linn), that most graceful of ferns.

When sufficient sleepers are collected at Dhakpathar a raft is made. About 120 broad-gauge, or 160 narrow-gauge sleepers are put into each raft, two layers of sleepers, laid flat and cross-wise, forming the main portion, others laid longitudinally keeping them together. They are all tied with coarse grass rope, and a few sleepers are placed on the top to form a sort of hurricane deck, on which the men stand. The rafts are about 50 feet long, and guided by two men with long sal barge poles, who keep them in mid-stream and shove them off the sides when going down rapids and round curves in the river. After being put together the number of sleepers in the raft is counted by the forester, and a pass is supplied on which the number is entered; they are checked at various places till the raft passes into the western Jumna canal at Bogriwalla, or down the river below the canal head.

A voyage down the river on a raft is as interesting and exciting an event as one down a Canadian river in a bark canoe manned by *voyageurs*; and calls to mind the ludicrous adventures of Mark Twain's "Tramp Abroad" on the German timber raft on the Rhine. In the river broads all is quiet and plain

sailing; but where there are rapids, and in the narrow artificial channels made an places where the river is almost impassable, the passage is adventurous, and all the skill of the raftsmen is required to prevent the raft being dashed against the sides and broken up; the numerous broken and stranded rafts testify to the fact that the passage is none of the easiest, and the greatest care is necessary. One particular spot, about three miles above Rampur Mandi is the Scylla and Charybdis of the raftsman. The Jumna here passes through a gorge where the depth of water is great, and the sides and bed rocky; a black conglomerate rock can be seen jutting into the main stream of the river, with a strong whirpool above it; many rafts go to pieces at this point and the sleepers are sucked under water; the men believe that they never appear again but they probably are carried down a passage in the rock under water, and come to the surface again lower down stream. There is no doubt that the passage at this point is dangerous, and the place a fearful one.

Good sport is to be had from a raft going down the river; duck and teal abound on the river bank; and, accustomed to the sight of the rafts constantly passing, allow them to approach very close before rising; a very fair bag can be made in this way. A spotted or hog deer can often be shot in the early morning when taking his morning drink before retiring for the day to the sal forests of the Siwaliks; while leopards, and occasionally tigers, are to be seen at the water's edge. If only one of the uninteresting looking sleepers on a railway could speak, what splendid accounts could it not give of lovely scenery and wild animals it had seen on its passage from the hills to the plains of India.—(*Z, in the Pioneer*).

VII—TIMBER AND PRODUCE TRADE.

Churchill and Sim's Circular.

October, 5th 1892.

EAST INDIA TEAK.—We have again to report a wretched delivery of 661 loads for the month, against 1,551 loads in September, 1891 and 2,040, loads in September, 1890, making only 7,656 loads for the nine months of this year, against 11,392 loads in 1891 and 12,926 loads in 1890. Some business is reported at fair rates in floating cargoes, a few being now due in Europe and some of them unsold. In the meantime the London Dock Stock is reduced to very moderate dimensions and prices here are stationary.

ROSEWOOD.—EAST INDIA.—There is no improvement in the demand, and therefore, although stocks are not heavy, they are sufficient.

SATINWOOD.—*Logs*, if plain or of small sizes, are neglected, but for large and figury logs fair prices are obtainable; *planks* and *boards* are not in demand.

EBONY.—There is no improvement in the demand and stocks remain heavy.

Price Current.

Indian Teak	per load	£9 10	to	£15
Cedar, Malabar,	per sup. ft.	3d	to	3¾d
Satinwood	per ton	£6	to	£10
Rosewood	per ton	£7	to	£10
Ebony	per ton (nominal)	£6	to	£9

MARKET RATES FOR PRODUCTS.

(Tropical Agriculturist, October, 1892.)

Cutch	per cwt.	24s.	to	34s.
Croton seeds	"	15s.	to	20s.
Gum Arabic, Madras	"	40s.	to	80s.
Gum Kino	"	80s.	to	90s.
India Rubber, Assam	per lb.	1s. 6d.	to	2s. 1d.
" Rangoon	"	1s. 6d.	to	1s. 9d.
Myrabolams, Bombay	per cwt.	9s.	to	10s. 6d.
" Jubbulpore	"	8s. 3d	to	9s. 6d.
" Godavary	"	8s.	to	9s.
Nux Vomica, good	"	8s.	to	9s. 6d.
Orchella, Ceylon	"	20s.	to	25s.
Redwood,	per ton	£3.	to	£3-10s.
Sandal wood, logs	"	£35	to	£60
" chips	"	£9	to	£30
Sapanwood	"	£4	to	£7
Tamarinds	per cwt	8s.	to	9s.

Some of our readers may be interested to learn in the Introduction to the Annual Accounts of the Seaborne trade and Navigation of Bengal, 1891-92, it is stated that the exports of Myrabolams to the United Kingdom in that year almost doubled and that the average price was higher, being Rs. 4-4 per cwt against Rs. 3-6 in the previous year. The improvement may be set down to the smaller importations of Valonia. We hear that the falling off is caused by an insect which has recently committed great havoc among Valonia acorns.

VIII.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—Gazette of India.

21st October, 1892.—No. 1307-F.—With reference to the Notification of this Department, No. 293-F., dated 27th February 1891, an extension of furlough for two months has been granted by Her Majesty's Secretary of State to Mr. H. C. Hill, Conservator of Forests, 1st Grade.

2.—Madras Gazette.

21th September, 1892.—Forester First-grade C. Dhan Sing to act as Ranger, Fifth Grade, sub. *pro tem.*, with effect from 1st September 1892.

29th September 1892.—Leave to Ranger M. Shumsudden Sahib for two months, from 8th September 1892, under article 369 of the Civil Service Regulations.

29th September 1892.—Mr. G. W. Thompson, Ranger, Fifth Grade, to act in the Fourth Grade during Ranger Shumsudden's absence on leave.

3rd October 1892,—No. 468.—In the schedule appended to the notification under section 63 (*a*) of Act V of 1882, published at pages 588 and 617 of Part I of the *Fort St. George Gazette*, dated 23rd September and 7th October 1884, respectively, the term "Extra-Assistant" should be inserted before the words " or Sub-Assistant Conservator."

4th October 1892.—In supersession of the sick leave granted to Ranger Mr. Bower and notified at page 1224, Part II of the *Fort St. George Gazette*, dated 6th September 1892, that officer is granted privilege leave, under article 291 of the the Civil Service Regulations, for twenty-two days from 25th August 1892.

6th October 1892.—Ranger M. L. Naraina Sastri from South Arcot to the Cuddapah District, to join at once.

Ranger M. Kothandarama Mudaliar from the Cuddapah to the Salem District.

Ranger C. N. Lakshman Row from the Salem to the South Arcot District.

11th October 1892.—No. No. 477.—Mr. R. McIntosh, Acting District Forest Officer, Cuddapah, is granted examination leave for two months.

18th October 1892.—No. 492.—Mr. E. D. M. Hooper, Acting Conservator of Forests, Northern Circle, is granted furlough for one year and six months, under article 340 (*a*) of the Civil Service Regulations.

18th October, 1892 —To Ranger M. Kothandarama Mudaliar privilege leave for one month from date of relief, under article 291 of the Civil Service Regulations.

16th October 1892.—To Ranger C. N. Lakshman Row privilege leave for two months from date of relief under article 269 of the Civil Service Regulations.

3.—BOMBAY GAZETTE.

7th October, 1892.—No. 7956.—His Excellency the Governor in Council is pleased to appoint Mr. G. K. Betham to act as Divisional Forest Officer, South Kanara.

12th October, 1892.—No. 8102.—Mr. A C. Robinson, South Sub-Division Forest Officer, North Thana, passed an examination in Marathi on the 7th October, 1892.

14th October 1892.—No. 8155.—In exercise of the power conferred by Section 70 of the Indian Forest Act, No. VII of 1878, the Governor in Council is pleased to direct that, in lieu of the fines fixed by Section 12 of the Cattle-trespass Act 1871 there shall be levied in the Nagar Taluka of the Ahmednagar District, on and after the 15th August 1892, in respect of cattle trespassing in the closed portions of the Reserved Forest Kurans mentioned in the margin,* and impounded under Section 69 of the Indian Forest Act, fines at the following rates, viz.:—

* Name of Kuran.	Name of village near which situated.
1. Sussawadi ...	1. Sussawadi. 2. Kolhar. 3. Pimpalgaon Ujani.
2. Kapurwadi ...	1. Kapurwadi. 2. Deogaon.
3. Shendi ...	1. Shendi. 2. Dangarwadi.
4. Manjarsumba ...	1. Pimpalgaon Malwi. 2. Manjarsumba. 3. Dehera.
5. Ghospuri ...	1. Gutawaree. 2. Ghospuri.

For each buffalo	One Rupee
For each horse, mare, gelding, pony, colt, filly, bull, bullock, cow or heifer	Eight annas.
For each calf, ass, pig, ram, ewe, sheep, lamb, goat or kid	Four annas.

No. 8155*A*.—His Excellency the Governor in Council is pleased, under Section 2 of the Indian Forest Act, No. VII of 1878, as amended by Act No. V of 1890, to appoint the officer for the time being holding the post of Executive Commissariat Officer, Ahmednagar, to be a Forest Officer, and, under Section 75 of the same Act, is pleased to appoint the said officer to do all acts and exercise all powers that are prescribed by the Act or by rules made under it to be done by a Forest Officer or by any Forest Officer: such powers to be exercised in respect of the Reserved Forest Kurans in the Nagar Taluka of the Ahmednagar District specified on the margin*, which have been assigned for the use of the Commissariat Department.

* Name of Kuran.	Name of village near which situated.
1. Sussawadi ...	1. Sussawadi 2. Kolhar. 3. Pimpalgaon Ujani.
2. Kapurwadi ...	1. Kapurwadi. 2. Deogaon.
3. Shendi ...	1. Shendi. 2. Dangarwadi
4. Manjarsumba ...	1. Pimpalgaon Malwi. 2. Manjarsumba. 3. Dehera.
5. Ghospuri ..	1. Gutawari. 2. Ghospuri.

4.—BENGAL GAZETTE.

1st October, 1892 —No. 3558.—In the list of revenue stations of the Sundarban Forest Division published in the notification, dated the 5th November, 1888, *for* "14, Cobaduk, left bank of Cobaduk river above its junction with Golputtoo river," *read* "14, Cobaduk, junction of the Golputtoo and Arpangassia rivers."

5.—N. W. P. & OUDH GAZETTE.

5th October, 1892.—No. 4622—Mr. B. B. Osmaston, Assistant Conservator of Forests, on return from furlough, to the Direction Division of the Oudh Circle as Working Plans Officer.

No. 4625.—Mr. F. Beadon-Bryant, Deputy Conservator of Forests, on return from furlough, to the Direction Division of the Central Circle as Working Plans Officer.

5th October, 1892.—No. 4628.—Mr. W. Shakespear, Deputy Conservator of Forests, from the Pilibhit to the Ganges Division.

No. 4631.—Pandit Keshava Nand, Extra Assistant Conservator of Forests, Kheri Division, to the charge of the Pilibhit Division.

6.—PUNJAB GAZETTE,

17th October, 1892 —No. 468.—In Punjab Government Notifications Nos. 379 and 380, dated the 20 August 1892, Serial No 20, in both lists and in the last columns, Mr. J. L. Pigot should be shown as "*Officiating Deputy Conservator of Forests, 3rd Grade*, seconded, on deputation" with effect from the 29th December 1891.

22nd October 1892.—No. 474.—*Notification.*—Mr. A. V. Monro, Assistant Conservator of Forests, on return from privilege leave, resumed charge of the Mooltan Forest Division on the forenoon of the 30th September 1892, relieving Babu Ladha Singh, Extra Assistant Conservator of Forests.

7.—CENTRAL PROVINCES GAZETTE.

28th September, 1892.—No. 3596.—Privilege leave for ninety days under Articles 277 and 291 of the Civil Service Regulations, is granted to Mr. P. H. Clutterbuck, Assistant Conservator of Forests, Raipur, with effect from the 8th September, 1892, or the subsequent date on which he may avail himself of it.

5th October, 1892.—No. 3711.—With reference to Government of India, Revenue and Agricultural Department, Notification No. 1037. F., dated the 12th August, 1892.

Mr. H. A. Hoghton, Deputy Conservator of Forests, reported his arrival at Nagpur on the forenoon of the 23rd August, 1892.

Mr. Hoghton is posted to the Seoni Forest Division.

On being relieved by Mr. Hoghton, Mr. V. S. Menzies, Assistant Conservator of Forests, Seoni Forest Division, will revert to the charge of the Nagpur-Wardha Forest Division.

No. 3712.—With reference to Notification No. 3711, dated the 5th October, 1892, Messrs. V. S. Menzies, Assistant Conservator of Forests,

and H. A. Hoghton, Deputy Conservator of Forests, respectively sur rendered and received charge of the Seoni Forest Division on the afternoon of the 31st August, 1891.

No. 3713.—With reference to Notification No. 3711, dated the 5th October, 1892, Messrs. H. S. K. Edie and V. S. Menzies, Assistant Conservators of Forests, respectively surrendered and received charge of the Nagpur-Wardha Forest Division the afternoon of the 5th September, 1892.

No 3714.—With reference to Notification No. 2617, dated the 26th July, 1892, Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests relinquished charge of his duties in the Chanda Forest Division on the afternoon of the 16th August 1892.

No. 3715.—Khan Sahib Munshi Mahomed Ghouse availed himself on the afternoon of the 27th August, 1892, of the leave granted him by Notification No. 2618, dated the 26th July, 1822, making over charge of the Balaghat Forest Division to Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests.

No. 3929.—Under the provisions of Government of India, Revenue and Agricultural Department, Circular No. 18-F., dated the 29th July, 1891, the following changes in the position and designation of the officers of the Lower controlling staff of the Forest service in the Central Provinces, Berar and Coorg, shall have effect from the 26th February, 1891 :—

NAME.	FROM.	TO.
Mr. Chander Kumar Chatterji.	Sub-Assistant Conservator of Forests, 1st. grade.	Extra- Assistant Conservator of Forests, 1st grade.
Khan Sahib Mahomed Ghouse ...	Do. do. ...	Do. do.
Mr. Mansukh Rai ...	Do. do. ...	Do. do.
Mr. Shridhar Ganesh Paranjpe ...	Do. 2nd grade ...	Do. 2nd grade.
Mr. Norman Chester McLeod ...	Do. do. ...	Do. do.
Mr. J. J. Hobday ...	Do. 3rd grade ...	Do. do.
Mr. C. H Haldane ...	Do. 2nd grade ...	Do. 3rd grade.
Mr. Ahmed Ali ...	Do. do. ...	Do. do.
Mr. Rasul Khan ...	Do. do. ...	Do. 4th grade.
Mr. Bukhan ...	Officiating do. 3rd grade.	Officiating do.
Mr. Ramchandra Krishna	Do. do. ...	Do. do.
Mr. R. C. Thompson.	Do. do. no probation.	Do. do. on. probation.

No. 3930.—Mr. Mahomed Kadar Buksh, Sub-Assistant Conservator of Forests, 3rd grade, sub. *pro tem.*, is appointed Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*, with effect from the 4th March, 1891.

No. 3931.—Mr. Shrinivasullu Naidu, Sub-Assistant Conservator of Forests, 3rd grade, on probation, is appointed Extra-Assistant Conservator of Forests, 4th grade, on probation, with effect from the 5th May, 1891.

No. 3932.—Mr. Ramchandra Krishna, Officiating Extra-Assistant Conservator of Forests, 4th grade, is appointed Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*, with effect from the 1st June, 1891.

No. 3933.—The following officers are confirmed in the 4th grade of Extra-Assistant Conservators of Forests, with effect from the 1st October, 1891 :—

Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem*

Mr. Mahomed Kadar Buksh, Extra-Assistant Conservator of Forests 4th grade, sub. *pro tem.*

Mr. Bukhan, Officiating Extra-Assistant Conservator of Forests, 4th grade.

No. 3934.—The following Extra-Assistant Conservators of Forests of the 4th grade are promoted to the 3rd grade, with effect from the 1st April, 1892 :—

Mr. Ramchandra Krishna.
Mr. Mahomed Kadar Buksh.

No. 3935.—Mr. R. C. Thompson, Extra-Assistant Conservator of Forests, 4th grade, on probation, is appointed Extra-Assistant Conservator of Forests of the 4th grade, sub. *pro tem.*, with effect from the 1st April, 1892.

No. 3936.—Mr. Shrinivasullu Naidu, Extra-Assistant Conservator of Forests, on probation, is appointed Extra-Assistant Conservator of Forests, 4th grade, with effect from the 1st April, 1892.

No. 3937 :—Mr. L. K. Martin is appointed as Extra-Assistant Conservator of Forests, 4th grade, on probation, with effect from the 24th July, 1892.

No 3938.—Mr. F. Seager is appointed as Extra-Assistant Conservator of Forests, 4th grade, with effect from the 24th August, 1892.

No. 3939.—The position of the officers of the Lower controlling staff of the Forest service in the Central Provinces, Berar and Coorg, stood as follows on the 25th August, 1892 : —

NAME	APPOINTMENT.		REMARKS.
Mr. Chander Kumar Chatterji.	Extra-Assistant Conservator of Forests, 1st grade.		
Khan Sahib Mahomed Ghouse ...	Do.	do.	
Mr. Mausukh Rai ...	Do.	do.	
Mr. Shridhar Ganesh Pranjpe ...	Do.	2nd grade.	
Mr. Norman Chester McLeod ...	Do.	do.	
Mr. J. J. Hobday ...	Do.	do.	
Mr. C. H. Haldane ..	Do	3rd grade.	
Mr. Ahmed Ali ...	Do.	do.	
Mr. Ramchandra Krishna ...	Do.	do.	
Mr. Mahomed Kadar Buksh ...	Do.	do.	
Mr. Rasul Khan ...	Do.	4th grade.	
Mr. Bukhan ...	Do.	do.	
Mr. R. C. Thompson ...	Do.	do.	Supernumerary.
Mr. Shrinivasullu Naidu	Do.	do.	
Mr. F. Seager ...	Do.	do.	
Mr. L. K. Martin ...	Do.	do.	On probation.

The 19*th October*.—1892.—No. 3945.—Mr. P. H. Clutterbuck, Assistant Conservator of Forests, availed himself, on the forenoon of the 6th instant, of the privilege leave granted him by Notification No. 3596, dated the 28th September, 1892, making over charge of the Raipur Division to Colonel W, S. Brooke, Deputy Commissioner.

8.—BURMA GAZETTE.

21*st September*, 1891.—No. 7.—With reference to Revenue Department Notification No. 105 dated Rangoon, the 16th June 1892, Mr. H. R. Thompson, Assistant Conservator of Forests, made over, and Mr. H. H. Forteath, Assistant Conservator of Forests, received, charge of the Upper Chindwin division on the afternoon of the 1st instant.

21*st September*, 1892.—No. 17.—With reference to Revenue Department Notification No. 279, dated Rangoon, the 16th September, 1892, Mr. F. J. Branthwaite, Officiating Deputy Conservator of Forests, received charge of the Toungoo division on the forenoon of the 20th September, 1892.

29*th September*, 1892.—No. 315.—Under the provisions of Article 291 of the Civil Service Regulations, privilege leave for 85 days is granted to Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, with effect from the 1st October, 1892, or the subsequent date on which he may avail himself of it.

9*th October*, 1892.—No. 324.—The following alterations of rank are ordered in the Forest Department :—

(1) With effect from the 10th June, 1892 :—
Mr. C. R. Dun, Assistant Conservator of Forests, 2nd grade, to officiate as Assistant Conservator, 1st grade.

(2) With effect from the 9th July, consequent on the departure of Mr. E. A. O'Bryen on privilege leave :
Mr. C. R. Dun, Assistant Conservator, 2nd (officiating 1st) grade, to officiate as Deputy Conservator, 4th grade.

(3) With effect from the 20th July, 1892, consequent on the departure of Mr. C. H. Hobart-Hampden on privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd, to officiate as Deputy Conservator, 2nd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(4) With effect from the 2nd August, 1892, consequent on the return of Mr. H. B. Ward from privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

(5) With effect from the 10th August, 1892, consequent on the departure of Mr. F. W. Thellusson on furlough :
Mr. T. A. Hauxwell, Deputy Conservator, 3rd (officiating 2nd) grade, to officiate as Deputy Conservator, 1st grade.
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. C. L. Toussaint, Assistant Conservator, 1st grade officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(6) With effect from the 17th August, 1892, consequent on the transfer of Mr. H. A. Hoghton to the Central Provinces, and pending the arrival of Mr. H. B. Anthony:

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator 3rd grade.

(7) With effect from the 16th September, 1892, consequent on the transfer of Mr. H. B. Anthony to Burma:

Mr. H. B. Anthony, Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 2nd grade.

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

13th October, 1892—No. 325.—The following postings and transfers are ordered in the Forest Department:—

Mr. C. W. Palmer, Deputy Conservator of Forests, on his return from leave, to the charge of the Minbu Forest division.

Mr. C. W. A. Bruce, officiating Deputy Conservator of Forests on his return from leave, to the charge of the Upper Chindwin Forest division.

Mr. H. H. Forteath, Assistant Conservator of Forests, to the headquarters of the Upper Chindwin Forest division.

Mr. A. M. Burn-Murdoch, Assistant Conservator of Forests, from Minbu to the charge of the Magwe sub-division of the Minbu Forest division.

3rd October, 1892.—No. 18.—With reference to Government of India, Revenue and Agricultural Department Notification No. 1037F., dated the 12th August, 1892, Mr. H. A. Hoghton, Deputy Conservator of forests, made over charge of his duties in this office on the afternoon of the 16th August, 1892.

8th October, 1892.—No. 19.—With reference to Revenue Department Notification No. 252F., dated the 27th August, 1892, Mr. E. B. Powell, Extra Assistant Conservator of Forests, made over charge of the Myanaung sub-division on the forenoon of the 12th instant and assumed charge of his duties in the Tharrawaddy division on the afternoon of the 16th instant.

No.—With reference to Revenue Department Notification No. 280 F., dated the 10th September, 1892, Mr. F. J. Branthwaite, officiating Deputy Conservator of Forests, assumed charge of the Pegu sub-division on the afternoon of the 28th ultimo.

13th October, 1892.—No. 9.—Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, availed himself of the privilege leave granted to him in Revenue Department Notification No. 315 (Forests), dated Rangoon, the 29th September, 1892, on the forenoon of the 3rd October, 1892.

14th October 1892,—No. 326.—(CORRIGENDUM).—In the heading to the form prescribed in Revenue Department Notification No. 98, dated the 17th March, 1892, *for* "VII A" *read* "VII B."

No. 327 —In exercise of the power conferred by section 37 of the Burma Forest Act, 1881, and in supersession of the notifications superseded thereby, the Chief Commissioner prescribes the following rules to regulate the matters referred to in clauses *(c)*, *(d)*, *(g)*, and *(h)* of the said section :—

8. No person shall cut, saw, convert, or remove any tree other than a reserved tree on any land at the disposal of Government, not included in a reserved forest or village forest, or the timber of any such tree, unless either—

(a) such tree or timber is cut, sawn, converted, or removed for the building of bridges, rest-houses, or other works of public utility ; or

(b) such tree or timber is cut, sawn, coverted, or removed for use within the revenue circle wherein, or within 5 miles of the place in which such tree or timber is produced for *bona fide* agricultural, fishery, or domestic purposes ; or

(c) such tree or timber is cut, sawn, converted, or removed for immediate conversion into firewood within the limits of the forest in which it is cut and before passing the station at which revenue would be ordinarily payable ; or

(d) such tree or timber is cut, sawn, converted, or removed for the purposes of burning charcoal by a person possessing a license in Form VIII ; or

(e) such timber is cut, sawn, converted, or removed under and subject to the conditions of a license granted by the Deputy Commissioner, or Forest Officer of the district, or by any officer empowered by the Deputy Commissioner in that behalf in one or other of the Forms Nos. VI, VIA, VII. VIIA, VIIB, IXA, and IXB given in the Appendix to these rules.

Provided, however, that—

(1) No one shall cut, fell, or lop *than* trees on any such land for the purpose of manufacturing *thansha* or collect or remove *than* timber for such purpose.

(2) No person shall cut trees within two chains of the bank of any stream to which the Deputy Commissioner of the district in which the stream is situated may by public notice declare this rule to apply. The notices published under this rule shall specify the points on the stream referred to between which the cutting of trees is prohibited, and shall be served on the headmen of all villiages near and posted up at convenient places in such villages and along the stream. The Deputy Commissioner may cancel or vary by publication in similar manner any notices issued under this rule.

No. 3932.—Mr. Ramchandra Krishna, Officiating Extra-Assistant Conservator of Forests, 4th grade, is appointed Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*, with effect from the 1st June, 1891.

No. 3933.—The following officers are confirmed in the 4th grade of Extra-Assistant Conservators of Forests, with effect from the 1st October, 1891 :—

Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem*

Mr. Mahomed Kadar Buksh, Extra-Assistant Conservator of Forests 4th grade, sub. *pro tem.*

Mr. Bukhan, Officiating Extra-Assistant Conservator of Forests, 4th grade.

No. 3934.—The following Extra-Assistant Conservators of Forests of the 4th grade are promoted to the 3rd grade, with effect from the 1st April, 1892 :—

Mr. Ramchandra Krishna.
Mr. Mahomed Kadar Buksh.

No. 3935.—Mr. R. C. Thompson, Extra-Assistant Conservator of Forests, 4th grade, on probation, is appointed Extra-Assistant Conservator of Forests of the 4th grade, sub. *pro tem.*, with effect from the 1st April, 1892.

No. 3936.—Mr. Shrinivasullu Naidu, Extra-Assistant Conservator of Forests, on probation, is appointed Extra-Assistant Conservator of Forests, 4th grade, with effect from the 1st April, 1892.

No. 3937 :—Mr. L. K. Martin is appointed as Extra-Assistant Conservator of Forests, 4th grade, on probation, with effect from the 24th July, 1892.

No 3938.—Mr. F. Seager is appointed as Extra-Assistant Conservator of Forests, 4th grade, with effect from the 24th August, 1892.

No. 3939.—The position of the officers of the Lower controlling staff of the Forest service in the Central Provinces, Berar and Coorg, stood as follows on the 25th August, 1892 : —

NAME	APPOINTMENT.		REMARKS.
Mr. Chander Kumar Chatterji.	Extra-Assistant Conservator of Forests, 1st grade.		
Khan Sahib Mahomed Ghouse ...	Do.	do.	
Mr. Mausukh Rai ...	Do.	do.	
Mr. Shridhar Ganesh Pranjpe ...	Do.	2nd grade.	
Mr. Norman Chester McLeod ...	Do.	do.	
Mr. J. J. Hobday ...	Do.	do.	
Mr. C. H. Haldane ..	Do	3rd grade.	
Mr. Ahmed Ali ...	Do.	do.	
Mr. Ramchandra Krishna ...	Do.	do.	
Mr. Mahomed Kadar Buksh ...	Do.	do.	
Mr. Rasul Khan ...	Do.	4th grade.	
Mr. Bukhan ...	Do.	do.	
Mr. R. C. Thompson ...	Do.	do.	Supernumerary.
Mr. Shrinivasullu Naidu	Do.	do.	
Mr. F. Seager ...	Do.	do.	
Mr. L. K. Martin ...	Do.	do.	On probation.

The 19*th October*.—1892.—No. 3945.—Mr. P. H. Clutterbuck, Assistant Conservator of Forests, availed himself, on the forenoon of the 6th instant, of the privilege leave granted him by Notification No. 3596, dated the 28th September, 1892, making over charge of the Raipur Division to Colonel W. S. Brooke, Deputy Commissioner.

8.—BURMA GAZETTE.

21*st September*, 1891.—No. 7.—With reference to Revenue Department Notification No. 105 dated Rangoon, the 16th June 1892, Mr. H. R. Thompson, Assistant Conservator of Forests, made over, and Mr. H. H. Forteath, Assistant Conservator of Forests, received, charge of the Upper Chindwin division on the afternoon of the 1st instant.

21*st September*, 1892.—No. 17.—With reference to Revenue Department Notification No. 279, dated Rangoon, the 16th September, 1892, Mr. F. J. Branthwaite, Officiating Deputy Conservator of Forests, received charge of the Toungoo division on the forenoon of the 20th September, 1892.

29*th September*, 1892.—No. 315.—Under the provisions of Article 291 of the Civil Service Regulations, privilege leave for 85 days is granted to Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, with effect from the 1st October, 1892, or the subsequent date on which he may avail himself of it.

9*th October*, 1892.—No. 324.—The following alterations of rank are ordered in the Forest Department :—

(1) With effect from the 10th June, 1892 :—
Mr. C. R. Dun, Assistant Conservator of Forests, 2nd grade, to officiate as Assistant Conservator, 1st grade.

(2) With effect from the 9th July, consequent on the departure of Mr. E. A. O'Bryen on privilege leave :
Mr. C. R. Dun, Assistant Conservator, 2nd (officiating 1st) grade, to officiate as Deputy Conservator, 4th grade.

(3) With effect from the 20th July, 1892, consequent on the departure of Mr. C. H. Hobart-Hampden on privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd, to officiate as Deputy Conservator, 2nd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(4) With effect from the 2nd August, 1892, consequent on the return of Mr. H. B. Ward from privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

(5) With effect from the 10th August, 1892, consequent on the departure of Mr. F. W. Thellusson on furlough :
Mr. T. A. Hauxwell, Deputy Conservator, 3rd (officiating 2nd) grade, to officiate as Deputy Conservator, 1st grade.
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. C. L. Toussaint, Assistant Conservator, 1st grade officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(6) With effect from the 17th August, 1892, consequent on the transfer of Mr. H. A. Hoghton to the Central Provinces, and pending the arrival of Mr. H. B. Anthony:

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator 3rd grade.

(7) With effect from the 16th September, 1892, consequent on the transfer of Mr. H. B. Anthony to Burma:

Mr. H. B. Anthony, Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 2nd grade.

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

13th October, 1892—No. 325.—The following postings and transfers are ordered in the Forest Department:—

Mr. C. W. Palmer, Deputy Conservator of Forests, on his return from leave, to the charge of the Minbu Forest division.

Mr. C. W. A. Bruce, officiating Deputy Conservator of Forests on his return from leave, to the charge of the Upper Chindwin Forest division.

Mr. H. H. Forteath, Assistant Conservator of Forests, to the headquarters of the Upper Chindwin Forest division.

Mr. A. M. Burn-Murdoch, Assistant Conservator of Forests, from Minbu to the charge of the Magwe sub-division of the Minbu Forest division.

3rd October, 1892.—No. 18.—With reference to Government of India, Revenue and Agricultural Department Notification No. 1037F., dated the 12th August, 1892, Mr. H. A. Hoghton, Deputy Conservator of forests, made over charge of his duties in this office on the afternoon of the 16th August, 1892.

8th October, 1892.—No. 19.—With reference to Revenue Department Notification No. 252F., dated the 27th August, 1892, Mr. E. B. Powell, Extra Assistant Conservator of Forests, made over charge of the Myanaung sub-division on the forenoon of the 12th instant and assumed charge of his duties in the Tharrawaddy division on the afternoon of the 16th instant.

No.—With reference to Revenue Department Notification No. 280 F., dated the 10th September, 1892, Mr. F. J. Branthwaite, officiating Deputy Conservator of Forests, assumed charge of the Pegu sub-division on the afternoon of the 28th ultimo.

13th October, 1892.—No. 9.—Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, availed himself of the privilege leave granted to him in Revenue Department Notification No. 315 (Forests), dated Rangoon, the 29th September, 1892, on the forenoon of the 3rd October, 1892.

14th October 1892,—No. 326.—(CORRIGENDUM).—In the heading to the form prescribed in Revenue Department Notification No. 98, dated the 17th March, 1892, *for* "VII A" *read* "VII B."

No. 327.—In exercise of the power conferred by section 37 of the Burma Forest Act, 1881, and in supersession of the notifications superseded thereby, the Chief Commissioner prescribes the following rules to regulate the matters referred to in clauses *(c)*, *(d)*, *(g)*, and *(h)* of the said section :—

8. No person shall cut, saw, convert, or remove any tree other than a reserved tree on any land at the disposal of Government, not included in a reserved forest or village forest, or the timber of any such tree, unless either—

(a) such tree or timber is cut, sawn, converted, or removed for the building of bridges, rest-houses, or other works of public utility ; or

(b) such tree or timber is cut, sawn, coverted, or removed for use within the revenue circle wherein, or within 5 miles of the place in which such tree or timber is produced for *bona fide* agricultural, fishery, or domestic purposes ; or

(c) such tree or timber is cut, sawn, converted, or removed for immediate conversion into firewood within the limits of the forest in which it is cut and before passing the station at which revenue would be ordinarily payable ; or

(d) such tree or timber is cut, sawn, converted, or removed for the purposes of burning charcoal by a person possessing a license in Form VIII ; or

(e) such timber is cut, sawn, converted, or removed under and subject to the conditions of a license granted by the Deputy Commissioner, or Forest Officer of the district, or by any officer empowered by the Deputy Commissioner in that behalf in one or other of the Forms Nos. VI, VIA, VII. VIIA, VIIB, IXA, and IXB given in the Appendix to these rules.

Provided, however, that—

(1) No one shall cut, fell, or lop *than* trees on any such land for the purpose of manufacturing *thansha* or collect or remove *than* timber for such purpose.

(2) No person shall cut trees within two chains of the bank of any stream to which the Deputy Commissioner of the district in which the stream is situated may by public notice declare this rule to apply. The notices published under this rule shall specify the points on the stream referred to between which the cutting of trees is prohibited, and shall be served on the headmen of all villiages near and posted up at convenient places in such villages and along the stream. The Deputy Commissioner may cancel or vary by publication in similar manner any notices issued under this rule.

(3) On all firewood brought to Rangoon there shall be levied the following fees :—

	Rs.	A.	P.
On firewood not exceeding 6 feet in length and 2 feet in girth, per 1,000 billets	10	0	0
On firewood not exceeding 4 feet 6 inches in length and 2 feet in girth, per 1,000 billets	8	0	0
On firewood not exceeding 4 feet 6 inches in length and 1 foot in girth, per 1,000 billets	2	8	0
On firewood not exceeding 3 feet in length and 1 foot in girth, per 1,000 billets	1	0	0
On firewood small, in bundles of 10, not exceeding 1 foot in lenth, per 1,000 bundles	1	0	0

The above fees shall be paid at one or other of the collecting stations at Alôn, Pazundaung, Botataung, Williams street wharf, or Sinmaleik, and no firewood shall be removed until the fees payable in respect thereof have been paid.

9. No person shall collect or remove wood-oil or resin, the natural produce of any land at the disposal of Government, not included in a reserved or village forest, except under and in accordance with the conditions of a license granted by the Deputy Commissioner, or Forest Officer of the district, or by an officer empowered by the Deputy Commissioner in that behalf, in one or other of the Forms X and XI, given in the Appendix to these rules.

a. No person shall burn charcoal on any land at the disposal of Government and not included in a reserved or village forest, except under and in accordance with the conditions of a license granted by the Deputy Commissioner or the Forest Officer of the district, or by any officer empowered by the Deputy Commissioner in that behalf, in Form VIII given in the Appendix to these rules

9*b*. No person shall make use of the natural produce of any land at the disposal of Government and not included in a reserved or village forest other than natural produce of the kinds referred to in Rules 8 to 9*a*, except under and in accordance with a license granted by the Deputy Commissioner or the Forest Officer of the division or by any officer empowered by the Deputy Commissioner in that behalf for such time and on such conditions as the said Deputy Commissioner or Forest Officer may prescribe.

Provided that in any district in which the Deputy Commissioner deems it unadvisable to issue licenses for the making use of any particular kind of natural produce to which this rule applies, the Deputy Commissioner or the Forest Officer of the division may sell by public auction annually, to the highest bidder, the right to collect such produce in any defined or demarcated tract.

10. Any person infringing Rule 5, or Rule 8, or Rule 9, or Rule 9*a*, or Rule 9*b*, shall be punishable with imprisonment for a term which may extend to six months, or with fine which may extend to Rs. 500, or with both.

No. 328.—With reference to the foregoing notification, the Chief Commissioner directs that so much of clause (*e*) of Rule 8 as prescribes Forms VIA and VIIA shall not come into force till the 1st January, 1893.

No. 329.—In exercise of the power prescribed by section 37 of the Burma Forest Act, 1881, the Chief Commissioner directs that the figure and letter "9*a*" shall be substituted for the figure "8" in the form prescribed in Revenue Department Notification No, 267, dated the 17th November 1891.

No. 333.—In exercise of the power conferred by section 46 of the Burma Forest Act, 1881 the Chief Commissioner directs that in Revenue Department Notification No. 75 dated the 30th May 1890, the following words, namely.

"Clauses (*a*) to (*d*) of Rule 8 of the rules published in Revenue Department Notification No. 327, dated the 14th October, 1892,"

shall be substituted for the words—

"Clauses (*a*) to (*c*) of sub-head (1), Rule 8 of the rules published under this Department Notification No 11 (Forests) dated the 10th January 1883, as revised by this Department Notification No. 108 (Forests), dated the 1st August, 1889."

No. 331.—In exercise of the power conferred by section 43 of the Burma Forest Act, 1881, the Chief Commissioner makes the following amendments in Rules 12 and 23 of the Lower Burma Forest Rules published in Revenue Department Notification No. 15, dated the 23rd January, 1892, and No. 76, dated the 30th May 1890 :—

1. In proviso (*b*) of Rule 12 *for* "Rule 8 (*b*)" *read* "Rule 8 (*b*) and (*d*)."

2. In Rule 23, clause (*a*), for "Rule 8, sub-head (1), clauses (*a*) and (*b*)," *read* "Rule 8, clauses (*a*) and (*b*)."

No. 332.—In exercise of the power conferred by section 40 of the Burma Land and Revenue Act, 1876, and with the previous sanction of the Governor-General in Council, the Chief Commissioner makes the following rules to provide for the disposal of certain kinds of forest produce. These rules supersede Rules 121, 122, and 123 of the rules published in Revenue Department Notification No. 151, dated the 4th September 1890 :—

121. No person shall prepare or collect any produce of the kinds referred to in the abovementioned section, other than produce of the kinds referred to in Rules 8, 9, and 9a of the rules under the Burma Forest Act, 1881, published in Revenue Department Notification No. 327, dated the 14th October, 1892, except under and in accordance with, a license granted by the Deputy Commissioner, or the Forest Officer of the division, or by any officer empowered by the Deputy Commissioner in that behalf, for such time and on such conditions as the said Deputy Commissioner or Forest Officer may prescribe.

Provided that in any district in which the Deputy Commissioner deems it unadvisable to issue licenses for the making use of any particular kind of produce to which this rule applies, the Deputy Commissioner or the Forest Officer of the division may sell by public auction annually to the highest bidder the right to collect such produce in any defined or demarcated tract.

122. Any person who shall prepare or collect any produce of the kinds mentioned in Rule 121 without having acquired the right to do so in the manner provided in Rule 121 may, in addition to any other consequences to which may be liable, be punished on conviction before

a Magistrate with rigorous or simple imprisonment for a term not exceeding one month, or with a fine not exceeding Rs. 100, or with both.

17th October.—No. 333.—Mr. W. T. T. McHarg, Assistant Conservator of Forests, is transferred from Katha to the Mandalay Forest division.

No. 334 (CORRIGENDUM).—In this department Notification No. 295 dated the 20th September 1892, *for* "Nyaungbin" *read* "Nyaunglun" in the two places where the former word occurs.

20th October, 1892.—No. 349.—Mr. A. L. Home, Conservator of Forests, on his return from furlough, is posted to the charge of the Western Forest Circle, Upper Burma.

No. 350.—Mr. T. H. Aplin, Officiating Conservator of Forests, Western Circle, Upper Burma, on being relieved by Mr. A. L. Home, is posted to the charge of the Lower Chindwin Forest-division.

No. 351.—Mr. H. N. Thompson, Assistant Conservator of Forests, on being relieved of the charge of the Lower Chindwin division, is appointed to do duty as subdivisional Officer in the Lower Chindwin division.

No. 352.—Under the provisions of section 43, clause (*g*) of the Burma Forest Act, 1881, the Chief Commissioner is pleased to add the following place to the list of stations to which timber or other forest produce in transit shall be taken by those in charge of it for examination or for the realization of any money payable to Government in respect thereof, or in order that any mark may be affixed thereto :—

Pegu Forest Circle.

Thayetmyo division,—Minhla.

20th October, 1892.—No. 358.—In exercise of the power conferred by section 40 (2) (*g*) of the Upper Burma Forest Regulation, 1887, and in supersession of previous notifications, the Chief Commissioner adds the following rule to the rules under the Upper Burma Forest Regulation :—

32 (*a*) The undermentioned places are established as revenue stations to which forest produce shall be taken by the person in charge of it for examination, and for the realization of any money payable to Government and for the purpose of affixing marks thereto :

Eastern Forest Circle.

Division.	Revenue station.	Civil district in which station is situated.
Bhamo.	Bhamu ... ... Shwegu	Bhamo
Katha ...	Katha ... ... Dobin ... ... Kyundaung ... ... Tigyaing ... ... Kyanhnyat	Katha.

Mandalay	Madaya Mandalay including Nanda kyun Ava* including Amarapura *and Saging.† Paleik Kyauksè Myitha Thedaw Railway station Meiktila Road Railway station	Mandalay. *Mandalay.† Sagaing. Kyauksè Meiktila
Mu	Kyunhla Ye-u Shwebo Kyaukmyaung Myinmu	Ye u Shwebo. Sagaing.
Pyinmana	Pyawbwe Yamèthin Pyinmana Yeni	Yamethin. Pyinmana.

Western Forest Circle.

Division.	Revenue Station.	Civil district in which station is situated.
Yaw	Pakôkku	Pakôkku.
Upper Chindwin	Kindat	Upper Chindwin.
Lower Chindwin	Alôn, Chindwin river	Lower Chindwin.
Minbu	Zigat* (including Salè)* Mingôn* Mezali, Môn river	*Pakôkku. †Myingyan. *Magwe. Minbu.

No. 359.—In exercise of the power conferred by section 40 of the Upper Burma Forest Regulation, 1887, the Chief Commissioner makes the following amendments in the rules under the said Regulation :—

Rule 15.—Omit the words "appointed by the local Government in this behalf."

Rule 16—Omit the words "appointed by the local Government in this behalf."

Rule 25, clause (I).—Omit the word and figures "and 31," and *for* the word "apply" *read* "applies."

9.—Assam Gazette.

12*th October*, 1892.—No. 9131G.—Mr. J. E. Barrett, Deputy Conservator of Forests, on return from leave, is placed in charge of the Cachar Forest Division.

12*th October*, 1892.—No. 9132G.—Mr. G. H. Young, Deputy Conservator of Forests, Cachar Forest Division, on being relieved by Mr. J. E. Barrett, is placed in charge of the Kamrup Forest Division.

12*th October*, 1892.—No. 9133G.—Mr. A. M. Long, Assistant Conservator of Forests, Kamrup Forest Division, on being relieved by Mr. H. G. Young, is placed in charge of the Sibsagar Forest Division.

12*th October*. 1892.—No. 9134.—Mr. D. P. Copeland, Deputy Conservator of Forests, on return from privilege leave, is placed in charge of the Darrang Forest Division.

10.—HYDERABAD RESIDENCY GAZETTE.

19*th September*, 1892.—No. 278.—In consequence of the amalgation of the Controlling staff of the Forest Department of the Punjab, with those of the Central Provinces, Berar and Coorg, in accordance with Government of India Circular No. 30-F., dated the 29th December, 1891. the following list is published; showing the names and position of the officers on the combined lists on the 29th December 1891 :—

Serial number in list.	Name.	Position.
	Same as in Punjab Gazette, Notification No. 379 dated 20th August, 1892, *vide* September number of the *Indian Forester*.	

19*th September*, 1892.—No. 279.—Consequent on the appointment to the Central Provinces of Mr. H. S. K. Edie, *vide* Government of India Notification No. 532-F. dated the 6th May 1892, the amalgamated list of the Punjab, Central Provinces, Berar and Coorg, will on the 31st December 1891, stand as follows :—

Serial number in list.	Name.	Position.
	Same as in Punjab Gazette, Notification No. 380 dated 20th August, 1892, in September number of the *Indian Forester*.	

19*th September*, 1892.—No. 280.—Consequent of the transfer to the Imperial List of Mr. A. E. Wild, on his appointment as Conservator of of Forests, 3rd grade, *vide* Government of India Notification No. 526-F., dated 6th May 1892, the following promotions shall have effect from the 17th January 1892 :—

See Punjab Gazette Notification, No. 381, dated 20th August, 1892, as above.

19*th September*, 1892.—No. 281.—Consequent on the departure of Mr. F. S. Barker, Officiating Deputy Conservator of Forests, 3rd grade, on leave on medical certificate for 12 months, the following promotions shall have effect from the 22nd January 1892 :—

See Punjab Gazette Notification, No. 382, dated 20th August, 1892, as above.

19*th September*. 1892.—No 282 —Consequent on the return from furlough of Mr. W. King, Deputy Conservator of Forests, 4th grade, the following changes shall have effect from the 8th February 1892 :—

See Punjab Gazette Notification.—No 383 dated 20th August, 1892, as above.

19th September, 1892.—No. 283 —Consequent on the return from leave of Mr. G. S. Hart, Assistant Conservator of Forests, 1st grade, the following changes shall have effect from the 13th February 1892: —

See Punjab Gazette Notification.— No. 384 dated 20th August, 1892, as above.

19th September, 1892.—No. 284.—Consequent upon the death of Mr. A. J. Mein, Deputy Conservator of Forests, 3rd grade, the retransfer from Assam to the Punjab of Mr. A. M. Reuther, Deputy Conservator of Forests, 4th grade, and the transfer of Mr. J. L. Pigot, Deputy Conservator of Forests, 4th grade, from the Central Provinces to Assam, the following changes shall have effect from the 2nd of March 1892 :—

See Punjab Gazette Notification.—No 388 dated 20th August, 1892, as above.

19th September, 1892 —No. 285.—Consequent on the appointment of Mr. R. H. E. Thompson, Deputy Conservator of Forests, 1st grade, as Conservator of Forests, 4th grade, *vide* Government of India Notification No. 594-F., dated the 20th May 1892, the following promotions shall have effect from the 4th of April 1892 :—

See Punjab Gazette Notification.—No. 386, dated 20th August, 1892, as above.

19th September, 1899.—No. 286.—Consequent on the return from deputation in the Patiala State of Mr. G. G. Minniken, Deputy Conservator of Forests 2nd grade, the following changes shall have effect from the 5th May 1892 :—

See Punjab Gazette Notification.—No. 387 dated 20th August, 1892 as above.

19th September, 1892.—No. 287.—Consequent on the departure on three months' privilege leave of Mr. H B Anthony, Deputy Conservator of Forests, 4th grade, the following promotion shall have effect from fo the 8th June 1892 :—

See Punjab Gazette Notification.—No. 388 dated 20th August, 1892, as above

22nd September, 1892.—No. 201.—In supersession of so much of *Residency Orders* notification No 256, dated the 24th August 1892, as relates to the pay of Mr. Martin, Probationary Extra Assistant Conservator of Forests in Berar, the Resident is pleased to direct that that officer shall draw Rs. 150 per mensem with effect from the 24th July 1892.

4th October, 1892.—No. 302.—The Resident is pleased to declare that Mr. E. M Coventry, an Assistant Conservator of Forests, in Berar, has passed the examination prescribed for Forest Officers in the Hyderabad Assigned Districts in the subject and by the standard noted below :—

Lower Standard.

1. Land Revenue.
2. Forest Law.
3. Hindustani.

11.—MYSORE GAZETTE.

12th October, 1892 — No. 5162—G. 1242-92.—The 10 days' casual leave granted to Mr. B. Ramaswami Iyer, Officiating Assistant Conservator of Forests, Kadur District, in Notification No. 94 of the 4th May 1892, is hereby commuted into privilege leave and extended to 20 days with effect from such date as he may avail himself of the same.

INDIAN WOODS FOR TEA-BOXES.

The question of the possibility of starting a trade in tea-boxes manufactured from Indian woods has recently occupied the attention of the Inspector-General of Forests. Enquiries were made of Messrs. Davenport & Co., Calcutta, who are large importers of Japanese tea-boxes for supply to tea-gardens in India, and it appears from the particulars supplied by that firm that they annually import, or expect in the near future to import, some 1,500,000 boxes made of red Pine (*P. Thunbergii*) from Japan, of uniform tare, *viz.*, 19lb, and with the dimensions 23″ × 19″ × 18″ with 2″ dovetails.

There is no doubt that there is a very great opening for some good light tea-box which must, however, be sold in Calcutta for not more than 14 annas each, so as to leave a margin of profit both for the producer and middleman. The main points to be kept in view are that the boxes must not be heavier or more expensive than the Japanese boxes, and that the wood must be sweet smelling and free from all kind of taint.

Before people can be induced to take up the trade, the right kind of wood must be found in sufficient quantity and in suitable situations.

Sample tea-boxes made from Japan wood were sent to the Chief Forest Officers of Assam, the Andamans, and the Pegu Circle, Burma, who were asked to ascertain whether suitable woods for the manufacture of tea-boxes were obtainable in the forests under their charge. The opinions of these officers are embodied in the following *précis* of their reports, to which has been added information bearing on the subject already published in the *Indian Forester*, etc.

I.—ASSAM.

In 1883 the question was raised whether Government could do anything to improve the tea-boxes now generally in use, and the Inspector-General of Forests called on the Conservator of Forests for a memorandum on the subject, the main points and questions for consideration being—

(1) that the boxes were badly made;
(2) that certain species of wood had damaged the tea;
(3) how the making of the boxes could be improved;
(4) is the corrosion of the tea-lead due to the fact that unseasoned wood is used?
(5) which Assam woods are specially suited, and which are unsuited for tea-boxes?

(6) a rough estimate of the quantity of timber required annually for tea-boxes, and the quantity of timber of the kind recommended available in Assam, as well as the localities where such timber is available.

The following is an abstract of the note submitted by the Conservator of Forests :—

If the planters' own interests are not a sufficient inducement to make them manufacture good boxes, nothing the Government can do will influence them in the least. Next to good workmanship, perhaps dovetailing (which is not always done) and good iron-hooping instead of cane-hooping, as is still used in many gardens, would also be improvements; and, as a matter of course, a smaller box, say half maund box, would be less likely to get damaged than the present boxes, but that means additional expense, which, with the present low prices, has to be avoided.

I have arrived at the conclusion that there is no wood in Assam, if properly seasoned, that will damage the lead in which the tea is packed ; if not seasoned, the extent to which the different woods damage tea-lead must vary greatly. I think there is little or no doubt that almost any wood will spoil tea-lead if used without being seasoned,[1] and I have seen unpardonable recklessness in this respect within the last two or three years, inasmuch as wood quite green was cut down and brought to the factory one day, sawn up the next, and used as soon as required, which might be within a week or two of the time the tree was cut down. The reason for this recklessness, which was never noticed in former years, is that when tea-boxes were imported or sawn up by hand, the wood became seasoned before the box was made; but now-a-days nearly every garden has an engine to roll tea, and in the cold weather it is used for working a small saw bench with a circular saw to cut planks for tea-boxes.

As a matter of course, a light tough wood, easily worked, always recommends itself for boxes in preference to heavy and hard or brittle wood difficult to work; and, since in our mixed forests in the tea districts the soft woods greatly predominate, there is at present an abundance of wood for tea-boxes ; and, what is of most importance, most of these soft wood trees take only from thirty to forty years to reach a girth of 5 to 6 feet. This, together with the very scanty population in the province, and, comparatively speaking, the small forest areas now jhumed, are my reasons for estimating that there is a superabundance of this wood, and that for the next twenty years only a portion of what is available can be used, and we shall be able to meet all demands from our reserves.

[1] The subject of corrosion of the lead linings of Indian tea-boxes is dealt with in the *Indian Forester*, Volume X, 1884, pages 484 and 529, and in a Memorandum by Mr. A. Pedlar, Journ. Asiat. Soc., Bengal, Vol. LIV, Part II, No. 3, 1885.

An additional reason I have for thinking that our supplies are ample is that tea-planters will in future use little or no wood for fuel and charcoal for drying tea, since the coal mines near Makum are now opened out, and supply good coal which makes magnificent coke, both of which will be sold very reasonably.

It is not unlikely that the tea industry will largely increase, and I firmly believe that Indian tea will, to a great extent, supplant China tea, so that we shall have to provide for an increased demand for tea-box wood. This I consider can be met from the forests in the extreme east of the Brahmaputra valley, which are very extensive, but in which, for political reasons, we cannot just yet introduce forest conservancy.

The localities in which our mixed forests containing the wood best suited for tea-boxes exist are in the Brahmaputra valley, the country along the foot of the Himalayas from the Bor-Nadi opposite Gauhati, or the western boundary of the Darrang District, eastwards to the upper end of the valley, and on the south side the country at the foot of the Naga hills beginning in the west with the Nambar reserves and a large extent of forest south of them, all along through the Sibsagar District to Makum and the head-waters of the Buri and Noa Dehing as well as the Brahmaputra river.

In the Surma Valley we depend chiefly on the Cachar reserves, supplemented by what will be brought from Manipur and the Lushai Country.

As to the estimate of the quantity of timber required annually for tea-boxes, this can be pretty accurately made. The tea exported in 1881-82 from the Brahmaputra valley was 288,754 maunds, and, reckoning one cubic foot of timber for every maund of tea, which is pretty accurate, we require at present 288,754 cubic feet.

The exports of tea from 1882-91 are shown by the following table:—

	Exports of tea from	
	Brahmaputra Valley.	Surma Valley.
	Mds.	Mds.
1882-83	384,478	209,653
1883-84	337,717	196,954
1884-85	365,443	189,171
1885-86	428,021	176,748
1886-87	353,473	293,542
1887-88	461,499	313,123
1888-89	521,275	318,653
1889-90	545,378	369,019
1890-91	544,364	383,261

Mr. McKee, Officiating Conservator of Forests, reported (1892) that Mr. Fordyce considers Makai (*Shorea Assamica*) an unsuitable

wood for the purpose because of its comparative scarcity and because of its tendency to warp when cut into small scantling. Moreover, it pays better to sell the Makai trees standing at R6 per tree than to convert the timber into tea-boxes on which it is very doubtful if any profit could be made at the low price of annas 14 per box delivered in Calcutta.

There is little doubt that Assam possesses only one kind of suitable timber in sufficient abundance, *viz.*, Simul (*Bombax malabaricum*), and it is also nearly certain that the only opening for starting a departmental mill would be either at Gauhati or Dhubri, from which places freight to Calcutta would be moderate, and in which no private mills at present exist to create competition. But it is doubtful whether there is a sufficient supply of Simul within a reasonable distance to permanently feed a mill at either of these places. It must also be borne in mind that the tea-box industry is increasing in Assam. During the past year 394,129 boxes were made at Tezpur and Lakhimpur from wood obtained from the Forest Department, paying R17,792.

In a further letter Mr. McKee writes that it is likely that the local saw-mills of Lakhimpur, Darrang, and Cachar will before long supply the greater part of the box demand. All the gardens of these districts are now supplied by local mills, which obtained their timber either from the Forest Department or from private grants, and there are reasons for believing that the number of mills will be increased before long, as it is found that boxes can be supplied by them at nearly half the rate charged by the Calcutta houses, and of sufficiently good material. Tea-boxes in Assam are generally made from *Bombax malabaricum*, *Duabanga sonneratioides*, *Dipterocarpus turbinatus*, and one or two other light and inferior woods. When such wood is supplied to the mills by the Forest Department, a royalty of one anna per box is collected on the outturn, which it has been calculated is worth about R2 per tree.

The following statement of tea-boxes made from Government timber shows that the trade is a growing one:—

Year.	Number of boxes, large.	Number of boxes, medium.	Number of boxes, small.	Total number of boxes.	Royalty paid.
					R
1888-89 .	112,329	...	6,328	118,657	7,218
1889-90 .	95,293	1,021	9,670	105,984	6,305
1890-91 .	139,272	11,422	13,457	164,144	9,659
1891-92 .	347,499	24,738	21,890	394,127	17,792

In the *Indian Forester*, Volume X, 1884, page 243, a correspondent

considered that Roghu or Kadam (*Anthocephalus Cadamba*) is one of the best woods for tea-boxes, both on account of its natural qualities as a wood and as a tree, the growth being remarkably rapid for the first six or eight years. Ten-inch planks for boxes were cut out of trees only eight years old, and trees sixteen years old were felled, which, at 6 feet up, measured an average of 5 to 5 feet 5 inches girth, and, at 30 feet, 3 feet 8 inches in girth.

In the *Indian Forester*, Volume IX, 1883, page 611, Mr. Young, Assistant Conservator of Forests, Cachar Division, records an experiment made with green wood of the wild mango (*Mangifera sylvatica*), from which it was pretty evident that it possesses chemical properties injurious to tea lead, which are either dissipated or otherwise rendered harmless by seasoning, the corrosion of the lead coating of tea-boxes being generally due to the use of green wood still containing sap. Considerable loss was reported in 1884 as having been incurred by shippers owing to the choice of unsuitable wood (for tea-chests in China), especially that of the wild mango.

II.—Andamans.

Mr. Chester, Deputy Conservator of Forests, reports that he, some months ago, cut up a quantity of Didu (*Bombax insigne*) wood for tea-boxes and, after seasoning, cut it into planks of the size furnished by Messrs. Williamson, Magor & Co., Calcutta, for tea-boxes. Samples were sent to Messrs. Gillanders, Arbuthnot & Co., who valued them (without being cut in tenon and mortice) at 14 annas per box, and Mr. Chester expected soon to have an offer through them.

III.—Burma.

Mr. Carter, Conservator of Forests, reports that there are two common trees which, when converted into tea-boxes, may possibly compete with Japanese wood in the Calcutta market. These are *Bombax insigne* (Didu) and *Hymenodictyon excelsum* (Kusan). Arrangements were made for the delivery at Rangoon of 25 logs of each, and the Bombay-Burma Trading Corporation have undertaken to convert them into tea-boxes and send them to Calcutta for sale, if the expenses incurred do not prevent competition with the Assam boxes.

Kanyin (*Dipterocarpus*[1]) is very much heavier than the Japanese wood. The Manager of the Bombay-Burma Trading Association writes :—" I do not think kanyin has ever been tried for tea-boxes, and I doubt if it would be found suitable. We tried it some years ago for Cutch, but had to give it up as, by the time the shipment reached home, half the boxes were in pieces."

[1] *Dipterocarpus turbinatus*—" Mason says the Burmese distinguish two forms of this plant—*kanyin* (*ni*) red and *kanyin* (*phu*) white; but the latter, according to modern writers, is *D. alatus*."—*Dict., Econ. Prod., Ind.*

Major Bingham, Conservator of Forests, Tenasserim, reports as follows :—

We do not as a rule extract kanyin in this circle by Government agency, for the cost of extraction is so heavy that it pays better to issue licenses for it. Kanyin was made a reserved wood here on 20th October, 1890, and under trade and prepaid licenses we charge R10 and R8 per ton respectively. When kanyin was reserved, a large number of logs were left felled in the forest by licensees, as they said that, under the enhanced rates, as reserved timber it did not pay them to extract. These logs were brought out by Government agency, and with difficulty we got them down by paying the high rate of R7 per ton for extraction. At our timber sales it was found that the prices obtained were R12 and R12-8 per ton, thus leaving us only a small profit. So far to show that it does not pay to extract kanyin by Government agency for sale here.

For tea-boxes the calculation is as follows. Allowing for heart-shake, splitting, and waste, it is calculated that 2 tons of kanyin in the round will yield 1 ton of ½-inch boards, and 1 ton of ½-inch boards will give 60 tea-boxes (23″ × 19″ × 18″ and 2″ dovetails). Conversion in Moulmein is high, and the lowest quotation I can get for it is R10 per ton in the round. Packing comes to R7 for 60 boxes.

EXPENDITURE ON 60 BOXES.

	R	a.	p.
Extraction 2 tons kanyin . . .	14	0	0
Conversion	20	0	0
Packing	7	0	0
Shipping charges, etc., in Moulmein .	2	0	0
Freight	10	0	0
Total .	53	0	0

delivered f. o. b. at Calcutta.

At the price mentioned, *viz.*, annas 14 per box, 60 boxes would realise only R52-8, so that the trade would not pay at all.

Again, this would be for boxes that would have to be nailed together. To have the board lengths cut out for dovetailing would bring the charge for conversion to double (if not more) the amount quoted.

In weight, again, kanyin is too heavy, as will be seen from the following calculation. The cubical contents of the boards to make a box of the size indicated are —

2 boards top and bottom . . .	24″ × 19″ × ½″
2 sides ,, ,, ...	24″ × 19″ × ½″
2 ends ,, ,, ...	19″ × 19″ × ½″

$= \frac{2 \times 67'' \times 19'' \times \frac{1}{2}''}{1{,}728} =$ approximately ⅔ of a cubic foot.

Gamble, in his Manual of Indian Timbers, gives the average weight of Burma kanyin wood thoroughly dried as 46lb. Then ⅔ of 46lb is nearly 31lb.

IV—Bengal.

Mr. Dansey, Conservator of Forests, states that, having regard to the nature of the country, the difficulty of obtaining labour for the ordinary requirements of the tea concerns, and the very few local species of any use for the purpose, he does not think it strange that Bengal should not be able to compete with Japan in this particular industry.

The Kurseong Divisional Officer points out that shook boxes made from Japan wood are a little dearer than those made in the district, but that Managers consider the advantages of the latter to more than compensate for the difference in cost. Roughly, in the Terai the shook boxes cost R1-4 each, and those made from local wood R1-1-3 to R1-2-6, but the price varies very much.

In the *Indian Forester*, Volume IX, 1883, pages 28 and 377, the following list of common tea-box woods in Darjeeling is given by Mr. Gamble :—

(*a*) Terai.

Indian names.	*Botanical names.*
Toon.	Cedrela Toona, microcarpa or glabra.
Lampatia.	Duabanga sonneratioides.
Simul.	Bombax malabaricum.
Goguldhup.	Canarium bengalense.
Kadam.	Anthocephalus Cadamba.
Mandania.	Acrocarpus fraxinifolius.
Mainakat.	Tetrameles nudiflora.
Udal.	Sterculia villosa (bad).

(*b*) Hills.

Toon.	
Kabashi.	Acer Campbellii or lævigatum.
Mahua.	Engelhardtia spicata.
Gobria.	Echinocarpus dasycarpus.
Chilauni.	Nyssa sessiflora.
Lepchaphal.	Machilus edulis.
Tarsing.	Beilschmiedia Roxburghiana.

Mr. Gamble also states that in Chittagong Toon and other woods not well known are used, and that in Chota Nagpur he has seen Salai (*Boswellia thurifera*) used.

In a letter to the writer Mr. Gamble suggests that, in Chittagong, a floating water-wheel mill, such as one sees on the Rhine, made to work both ways according to the tide, might be set up at Kaptai or Chandraguna, and wood floated down to it from the huge forests of the Miani and Ruikheong. Toon, Bombax, Gmelina, and other soft woods could be got in sufficient abundance, and the cutting and extraction would be cheap, as also would the transit to Calcutta.

V.—Punjab.

In the *Indian Forester*, Volume IX, 1883, page 211, Mr. L. Gisborne Smith gives the following list of tea-box woods used by planters of the Kangra District :—

Palampur Tehsil.

Indian names.	*Botanical names.*
Chil	Pinus longifolia.
Rai.	Abies Webbiana.
Tos.	„ Smithiana.
Oi.	Albizzia stipulata.
Tún.	Cedrela Toona.
Mango.*	Mangifera indica.[1]
Simul.	Bombax malabaricum.

Kullu Tehsil.

Kail.	Pinus excelsa.
Rai.	Abies Smithiana (called Tos at Palampur).
Tos.	Abies Webbiana (called Rai at Palampur).

These are chiefly used, though there are several other woods which Mr. Smith had no doubt would answer the purpose, such as Alder, Elm, Poplar (Phalse), hill Tún and Chil. Deodar is not used for tea-boxes owing to its strong smell of turpentine.

IN OIL, RESIN OF URCEOLA ESCULENTA, AND THITSI VARNISH.

The following notes on the Burmese In oil, resin of Urceola esculenta and Thitsi varnish were received in response to a circular issued by the Inspector-General of Forests in connection with collections of Forest products for the Imperial Institute, London.

I.—In or Eng Oil.

(*Dipterocarpus tuberculatus.*)

In the Zamayi range Eng oil is extracted in small quantities for making torches, which, when manufactured, sell at the rate of ₹4 per 100. The method followed in obtaining the oil is as follows :—

From January to April trees of 6 feet girth and upwards are selected. In these trees, at a height of about 3 feet from the ground, incisions 9″ to 10″ deep and about 1′ wide are made into the heart-wood of the Eng tree. This incision is concave at the bottom, the concavity being large enough to hold from 20 to 50 ticals weight of the oil. The number of incisions varies from one

[1] Mr. Gamble informs me that in Dehra the planters all use mango wood, because nearly all their tea goes to the Commissariat Department, and the Military Department insists on mango wood, as the wood of the old boxes can be utilised.

to two in trees of 6 feet girth to 5 in trees of 15 feet girth. The oil is taken out three days after making the incision, and the hole is slightly fired.

After two years, if the upper surface of the incisions is pared, the oil again flows, but, after this has been done once or twice, it would appear that the oil does not exude, or, at least, not in sufficient quantity to make it pay, as fresh incisions are made some feet above the old decayed ones.

From the oil with *Salu* leaves and chopped wood (?) torches are made about 18 inches long and 6 inches in diameter.

F. J. BRANTHWAITE,

Deputy Conservator, Pegu Circle.

The In tree forms pure forests by itself, but other trees, such as Thitya and Thitsi, are often found growing in conjunction with it. The extent of almost pure In forests in the Prome District is nearly 100 square miles.

The age of tapping the tree is uncertain, but no trees are tapped before attaining a girth of about 4 feet.

The means employed to get the oil is to make a triangular cut in the tree to a depth of about 6 inches into the heart-wood, forming a kind of well. It is the usual thing for a tapper to make three of such wells in one tree at the same time. Every seven days for about two months he comes and takes away the oil in pots.

At the end of two months he removes to another tree. The only instrument used is a Burmese axe.

The oil, on being taken from the tree, is put in a pot, and about 15 per cent. of earth oil is added. It is then boiled for about an hour, and afterwards allowed to cool: as it cools it hardens and becomes resin.

The resin is used chiefly for caulking boats; otherwise there is not much demand for it. If mixed in the proportion of ⅔ earth oil and ⅓ In oil, the compound is used to spread on Burmese umbrellas to render them water-tight.

A man working for a year (and resin can be obtained all the year round) gets about 200 viss of resin, which is sold at Prome at about 6 annas a viss. About 1,500 viss of resin is sold in Prome. in a year.

H. HOBART HAMPDEN,

Deputy Conservator of Forests, Prome Division.

II.—RESIN OF URCEOLA ESCULENTA.

Kyet paungbin.

Urceola esculenta is to be met with in all parts of Burma more or less. It is obtainable in the hills here, and is also said to be abundant in the Pegu hills.

The tree is considered to be old enough for tapping at three years. It grows to a height of 20 to 25 feet, and, if any large trees are in the vicinity, it entwines itself round them.

A slanting cut is made with a *dah* into the tree, and immediately a milky looking substance flows from the cut. This juice is allowed to congeal, and then cut off in lumps before reaching a hardened state.

There is no method of treating the resin, as there is no market for the caoutchouc extracted from this tree here. All the Burmans declare that no one has ever extracted the juice, only plucked the fruit for sale.

The fruit is brought extensively into this and other bazars in Pegu for sale, and is very largely eaten by the Burmans. In the centre of the fruit is a quantity of soft white fibre, of a beautiful silky nature.

G. F. R. BLACKWELL,

Deputy Conservator, Shwegyin Division.

III.—THITSI VARNISH.

(*Melanorhœa usitata.*)

Thitsi does not form by itself pure forests, but is found in considerable quantities in conjunction with In and Thitya in the Prome District.

The age of tapping is uncertain, but it is not the custom to begin to do so till the tree has attained a girth of about 3 feet.

The bark is cut with a chisel, and the loose piece is lifted up so as to enable a bamboo cup, about 6 inches long and 3 inches in diameter, to be inserted. The cup is then hammered in far enough to prevent its falling with its own weight. After about seven days the cup is generally found to be full. If more is required, a fresh cut is made and the process repeated. The time for working is from June to December.

The varnish can be taken straight from the tree and used, no means being required to prepare it before hand.

Thitsi is used to lacquer almost every vessel in a Burmese house intended to contain either solid or liquid food, and is much used for varnishing musical instruments. It is also used extensively to put on pagodas and images preparatory to spreading on gold leaf.

One man manages to obtain about 100 viss of Thitsi a year, and sells it in the Prome bazaar for about R2 a viss. The

consumption of Thitsi is considerable throughout the district, and on an average about 10,000 viss are sold in the Prome bazar in a year.

C. H. HOBART HAMPDEN,

Deputy Conservator of Forests, Prome Division.

In the Dictionary of the Economic Products of India, under the heading Packing Cases, the following timbers are recorded as being used for tea cases :—

Acer cæsium.
„ Cambellii.
„ lævigatum.
Acrocarpus fraxinifolius.
[illegible]lus indica.
[illegible]
Artocarpus Chaplasha.
Bassia latifolia.
Beilschmiedia Roxburghiana.
Bombax malabaricum.
Canarium bengalense.
Casearia glomerata.
Cedrela Toona.
Cordia Myxa.
Daphnidium pulcherrimum.
Derris robusta.
Duabanga sonneratioides.
Echinocarpus dasycarpus.
Ehretia Wallichiana.
Elæocarpus lanceæfolius.
Engelhardtia spicata.
Erythrina indica.
Gmelina arborea.
Machilus odoratissima.
Mangifera indica.
„ sylvatica.
Melia dubia.
[illegible]lia Cathcartii.
Morus indica.
Pentace burmanica.
Phœbe attenuata.
Pinus excelsa.
„ longifolia.
Polyalthia Jenkinsii.
„ longifolia.
„ simiarum.
Pyrus lanata.
Sterculia villosa.
Stereospermum chelonoides.
Terminalia myriocarpa.
Tetrameles nudiflora.

EDGAR THURSTON,

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